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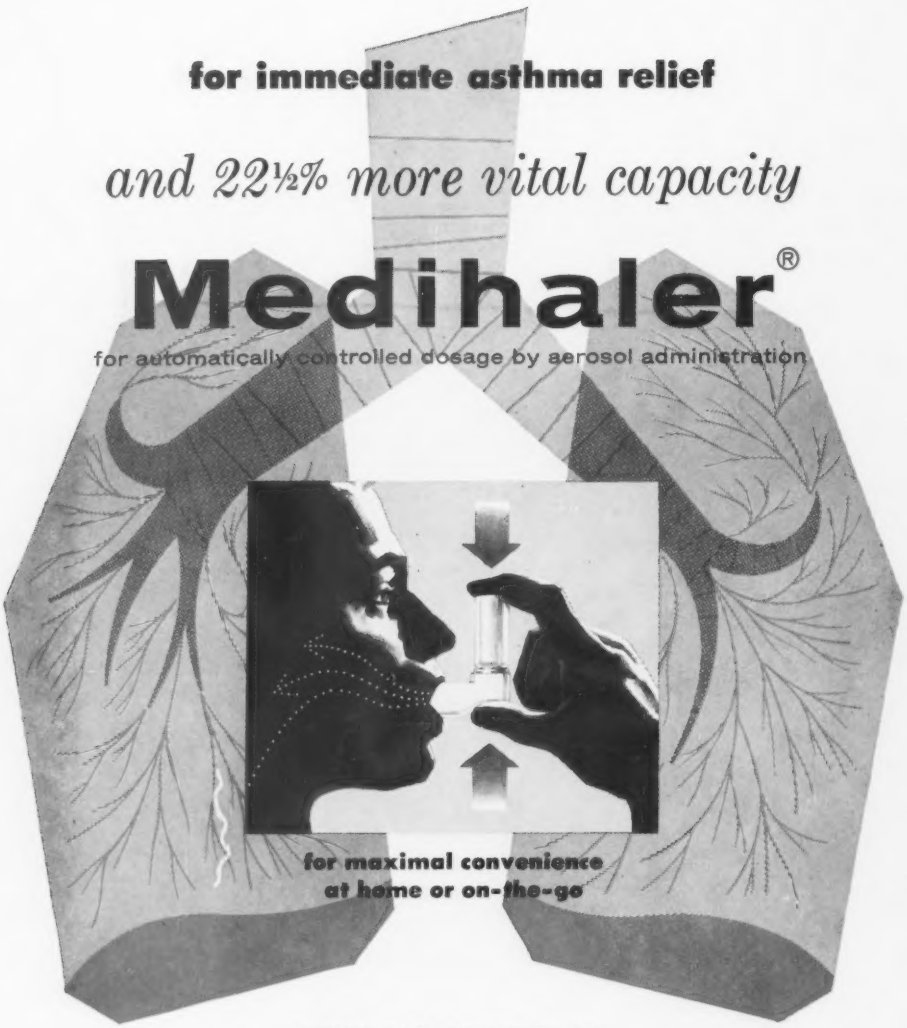

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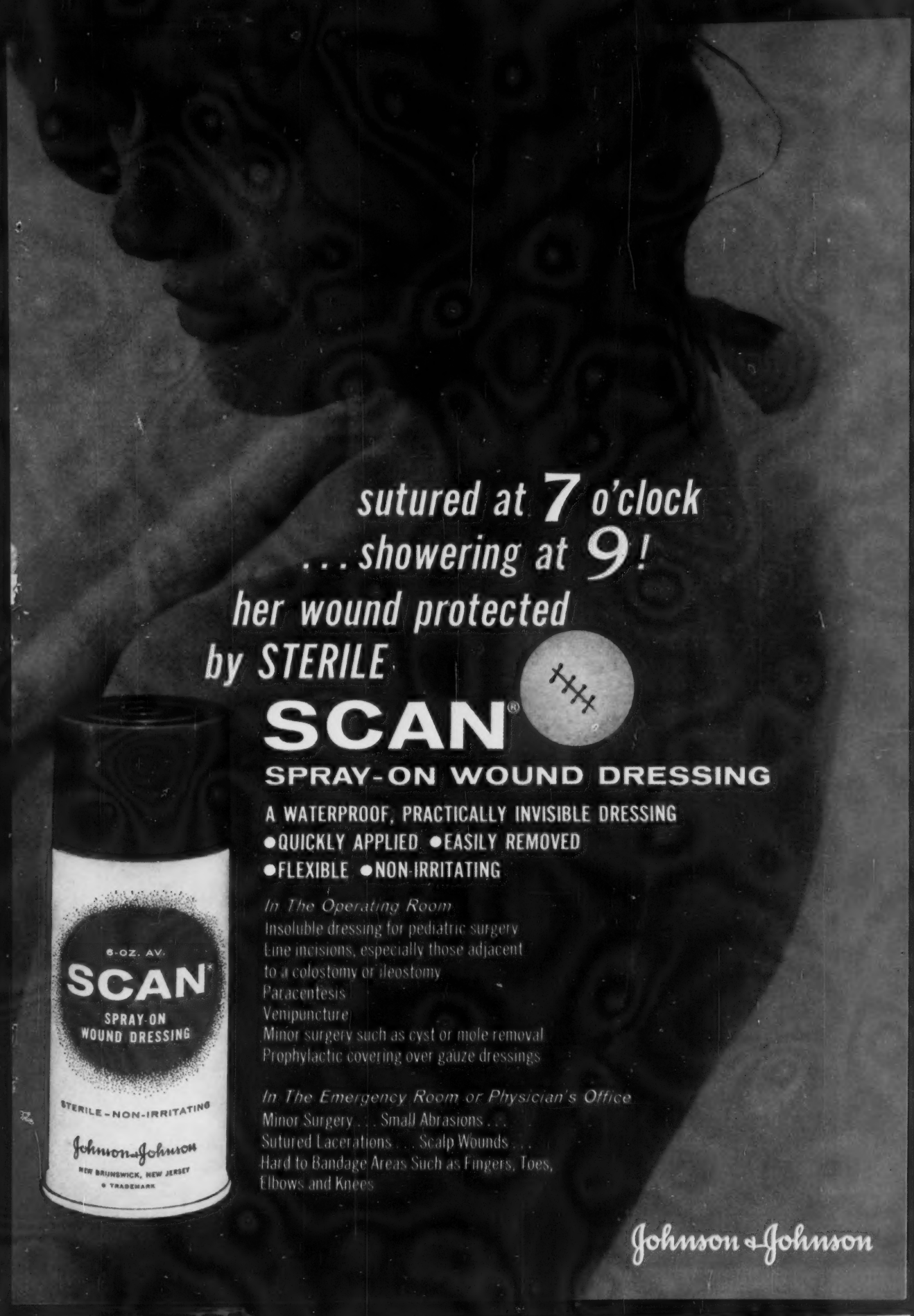
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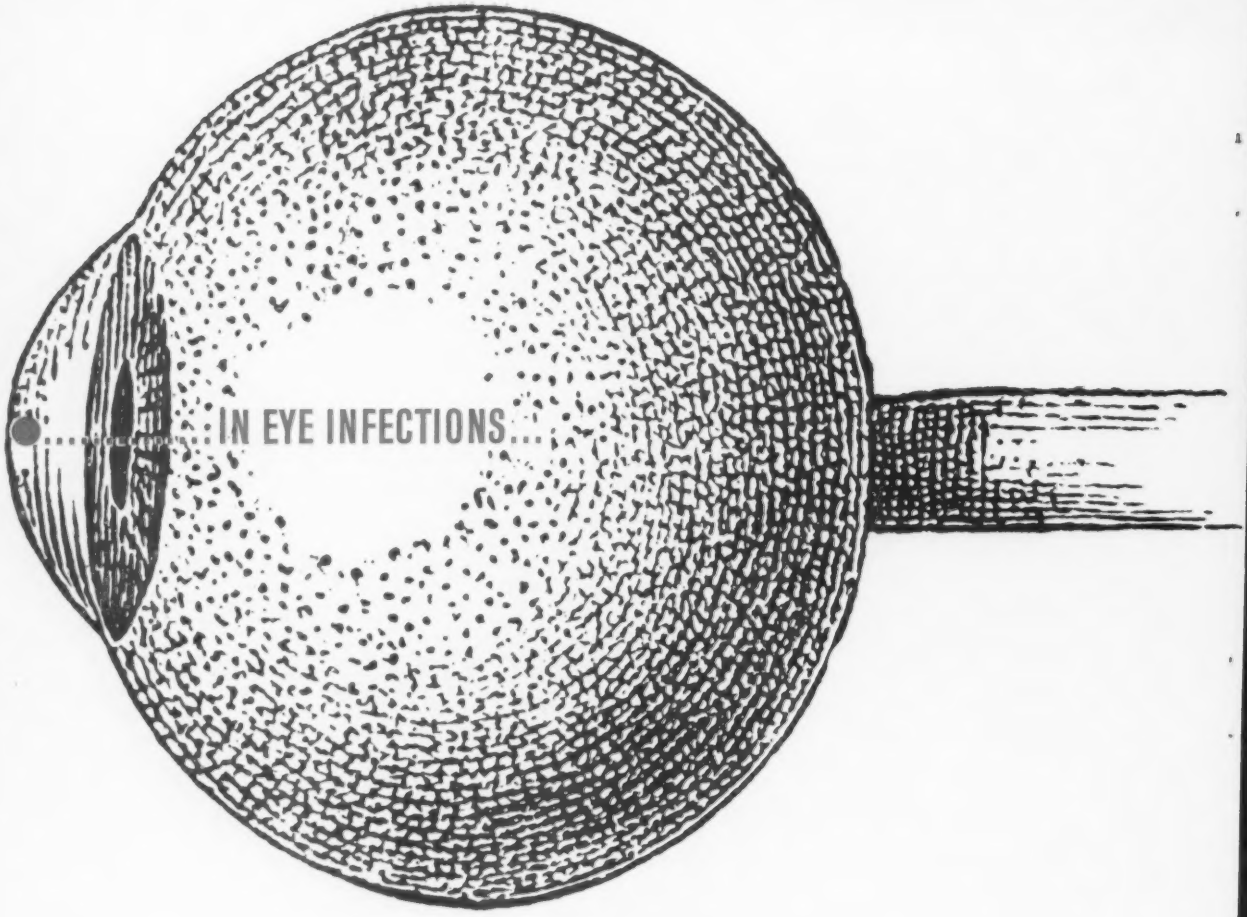

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INDUSTRIAL MEDICINE and SURGERY

ESTABLISHED 1932

The International Journal of Medicine in Industry

OCTOBER, 1960
VOLUME XXIX
NUMBER 10

CONTENTS

Some Physiological Correlates of Noise Induced Hearing Loss 445
Merle Lawrence, Ph.D.

Rehabilitation of Foundry Workers with Active Pulmonary Tuberculosis 453
L. E. Hamlin, M.D.

Simplified Psychiatric Nomenclature for the Industrial Physician and General Practitioner 461
Charles E. Goshen, M.D.

The Early Recognition of Behavioral Disturbances 465
R. W. Waggoner, M.D.

The Industrial Physician and the Depressed Patient 470
Robert L. Stubblefield, M.D., and
William R. Conte, M.D.

Psychiatry in Industry 474
Jack R. Ewalt, M.D.

Occupational Rehabilitation Following Mental Illness 480
Leonard E. Himler, M.D.

Some of the Problems of Employment of the Cardiac in Industry 484
Arthur C. Kerkhof, M.D.

The Four Way Test 490
O. L. Hanson, M.D.

Letters 492

Abstracts 493

Science Miniature: Helicopter Flicker Disease, A New Occupational Disease 493
Carey P. McCord, M.D.

Books 493

Editorials: Industrial Medicine and the Private Practitioner 495

He Who Gets Squiffed 496

Personal News and Notes 4, 6

Comment and Opinion 41

Index of Advertisers 54

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PERSONAL NEWS AND NOTES

The A.M.A. Council on Occupational Health will hold its 20th annual Congress on Industrial Health in Charlotte, N. C., October 10-12. The program will include panel discussions on: "Occupational Health Programs in Small Employee Groups," "Mental and Emotional Health in Industry," and "When Should My Patient Return to Work?"

Papers to be presented include: "Health Hazards from Ionizing Radiation" by CHARLES L. DUNHAM, M.D., Director of the Division of Biology and Medicine, U. S. Atomic Energy Commission, and "Occupational Health in Agriculture" by FRANKLIN H. TOP, M.D., Professor of Preventive Medicine at the State University of Iowa College of Medicine. N. H. COLLISON, Vice President of the Olin Mathieson Corporation, will speak on "What Management Expects of an Occupational Health Program."

The annual banquet will be addressed by E. VINCENT ASKEY, M.D., President of the American Medical Association. WILLIAM P. SHEPARD, M.D., Chairman of the Council on Occupational Health, will preside over the three day meeting. There is no registration fee.

GILBERT B. MEYERS, M.D., has been appointed Medical Director of Socony Mobil Oil Company's installations at Paulsboro, N. J. He succeeds Chester L. Samuelson, M.D., who now heads the Ohio Oil Company's Medical Department.

A native of Pittsburgh, DR. MEYERS attended Carnegie Institute of Technology and is a graduate of St. Vincent College, Latrobe, Pa. He received his M.D. degree from the University of Pittsburgh Medical School in 1947. He is an Assistant Professor in Public Health and Preventive Medicine at Hahnemann Medical College, Philadelphia. His most recent position was Manager of Health Services at RCA's Camden, N. J., plant.

Symposia on Vision in Industry and Industry's Job in Rehabilitating the Handicapped will highlight occupational health nursing sessions of the 48th National Safety Congress, the annual convention of the National Safety Council, which will be held Oct. 17-21, 1960, in Chicago.

The symposium on Vision in Industry will be concerned with the care of industrial workers' eyes. Talks will be given by EARL H. MERZ, M.D., ophthalmologist, Chicago; STELLA L. BRUEGGAN, R.N., of the Illinois Society for the Prevention of Blindness, Chicago, and JAMES E. O'NEIL, Industrial Service Director, National Society for the Prevention of Blindness, New York City.

In the session on Rehabilitation in Industry, L. S. SMITH, Director of Public Relations, Thilmany Pulp & Paper Co., Kaukauna, Wis., and FRED S. MARSHALL, M.D., Medical Advisor, Fox Valley Sheltered Workshop, Appleton, Wis., will discuss placement and rehabilitation of handicapped persons in industry.

New York University announces the publication of *New York University Workmen's Compensation Study*. This study was done at the request of and under a contract from the New York State Workmen's Compensation Board. It contains an analysis and discussion of such subjects as the current medical care system in New York State, alternate systems of medical care, early referral, the economic aspects of rehabilitation, financial benefits during rehabilitation, state-operated rehabilitation centers, "compulsory" rehabilitation, controverted cases, rehabilitation facilities in New York State and the implications for workmen's compensation of other systems of disability benefits.

The statistical section contains a detailed analysis of 1,390 cases closed in 1957 covering type of insurance coverage, types of injury, type of settlement, type of settlement by major injury, referrals for rehabilitation, type of injury among persons referred for rehabilitation, average treat-

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ment days, and average cost of treatment. The study was done on an all-University basis with the major responsibilities taken by the Institute of Labor, Relations and Social Security and the Institute of Physical Medicine and Rehabilitation, New York University Medical Center. Copies of the study in bound book (300 pages; 6" x 9") can be ordered from the Institute of Physical Medicine and Rehabilitation, New York University Medical Center, 400 E. 34th Street, New York 16, New York, Attn: Workmen's Compensation Study. The price is $6.50.

ROBERT L. LEMBKE, M.D., Pryor, Okla., has been appointed staff physician in Continental Oil Company's medical division, with headquarters at Ponca City, Okla., it was announced by W. O. ARMSTRONG, M.D., Medical Director.

DR. LEMBKE served in the United States Navy during World War II and received his doctor of medicine degree in 1950 from the University of Oklahoma School of Medicine.

For the past nine years, he has been practicing general medicine at Pryor, where he has been chief of staff at Grand Valley Hospital.

DAVID TINGLE, M.D., was appointed District Medical Director for the Frick Coal District, U. S. Steel Corporation, Uniontown, Pa., it was announced by R. B. O'Connor, M.D., Medical Director, U. S. Steel Corporation.

DR. TINGLE was graduated from the University of Sheffield Medical School, Yorkshire, England, in 1952. He received a Diploma in Public Health and in Industrial Health from the London School of Hygiene in 1956. DR. TINGLE served his internship at the Sheffield Royal Infirmary and Western Hospital, Doncaster, both in Yorkshire, England. He served as a Medical Officer in the Royal Air Force in 1953-4. Following his release from the service, he was in general industrial medical practice in Sheffield, Yorkshire, and Dagenham, Essex, England. He served as Assistant Health Officer, Reading, England in 1956-7. In 1957 he emigrated to this country and served as the County Health Officer, Elizabethtown, North Carolina for one year. In 1958 he began a Research Fellowship at Johns Hopkins Hospital School of Public Health, and very recently completed his course of study leading to a Doctorate in Public Health.

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Recognition from Canada has come to a U. S. Public Health Service scientist, LAURENCE IRVING, M.D., Chief Physiologist at the Arctic Health Research Center, with his election to honorary membership in the Canadian Physiological Society. In electing him, the Society cited his work in Canada and the close association he maintains with Canadian physiologists, especially in the field of environmental physiology.

Announcement of the new honorary members — a small group of scientists particularly concerned with Canadian Physiology, was made at the Society's annual meeting in Winnipeg. The Society is accepting honorary members for the first time in observance of of its 25th anniversary next year.

DR. IRVING, the author of numerous scientific papers, has an honorary M.D. degree from the University of Oslo and an honorary Sc.D. degree from Bowdoin College.

During his 12 years at the AHRC in Anchorage, Alaska, northernmost research station of the USPHS he has studied the physiology of arctic birds, marine mammals, hogs and man, combining his two specialties, ornithology and physiology.

Discussions on Occupational Health will be part of the American Public Health Association's 88th Annual Meeting to be held in San Francisco October 31 to November 4, 1960. "Noise as a Health Problem" and "Public Health Aspects of Agricultural Chemicals" are two of the topics listed in the program.

More than 5,000 public health authorities are expected at the five-day meeting.

WALTER F. BALEIKO, M.D., has joined Standard Oil Company (Indiana) as physician in the general office medical department. He was formerly with Crane Company. After graduating *cum laude* from Loyola University School of Medicine, he served his internship at Cook County Hospital and was later medical resident there. He was also clinical assistant in medicine at Illinois Research Hospital. In World War II he was commanding officer of a hospital ship platoon and a transport surgeon as a Captain in the U. S. Army.

DR. BALEIKO is a member of the American Medical Association, Illinois and Chicago Medical Societies, Industrial Medical Association, and Health-In-Industry Committee of the Chicago Association of Commerce and Industry.

R. LOMAX WELLS, M.D., and LOGAN T. ROBERTSON, M.D., have been reappointed to posts on the Medical Advisory Council of the American Association of Industrial Nurses. DR. WELLS, who is Medical Director of the Chesapeake and Potomac Telephone Companies, Washington, D. C., will continue as Chairman of the Council. DR. ROBERTSON is an occupational health consultant in Asheville, N. C.

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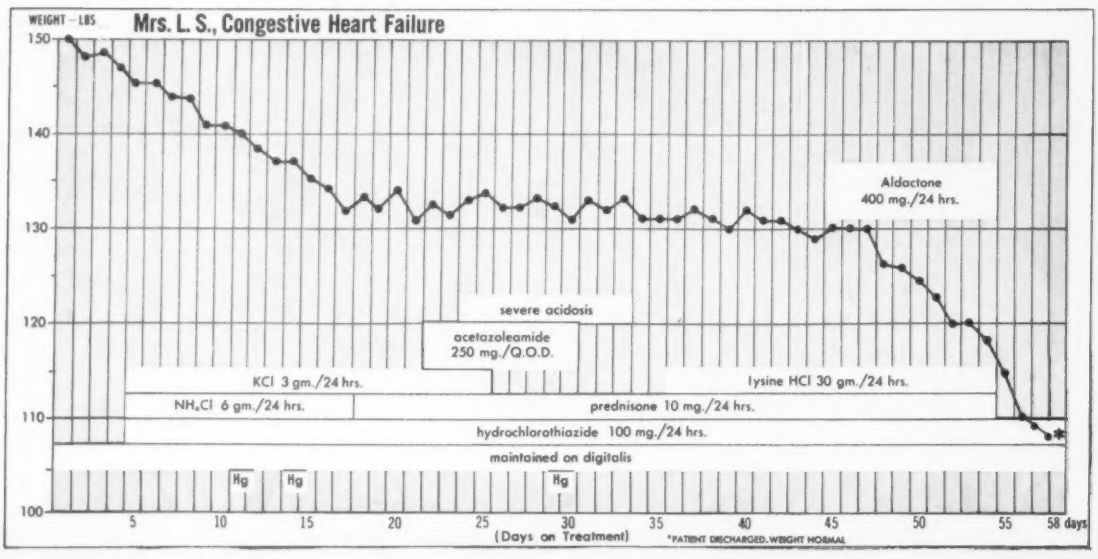

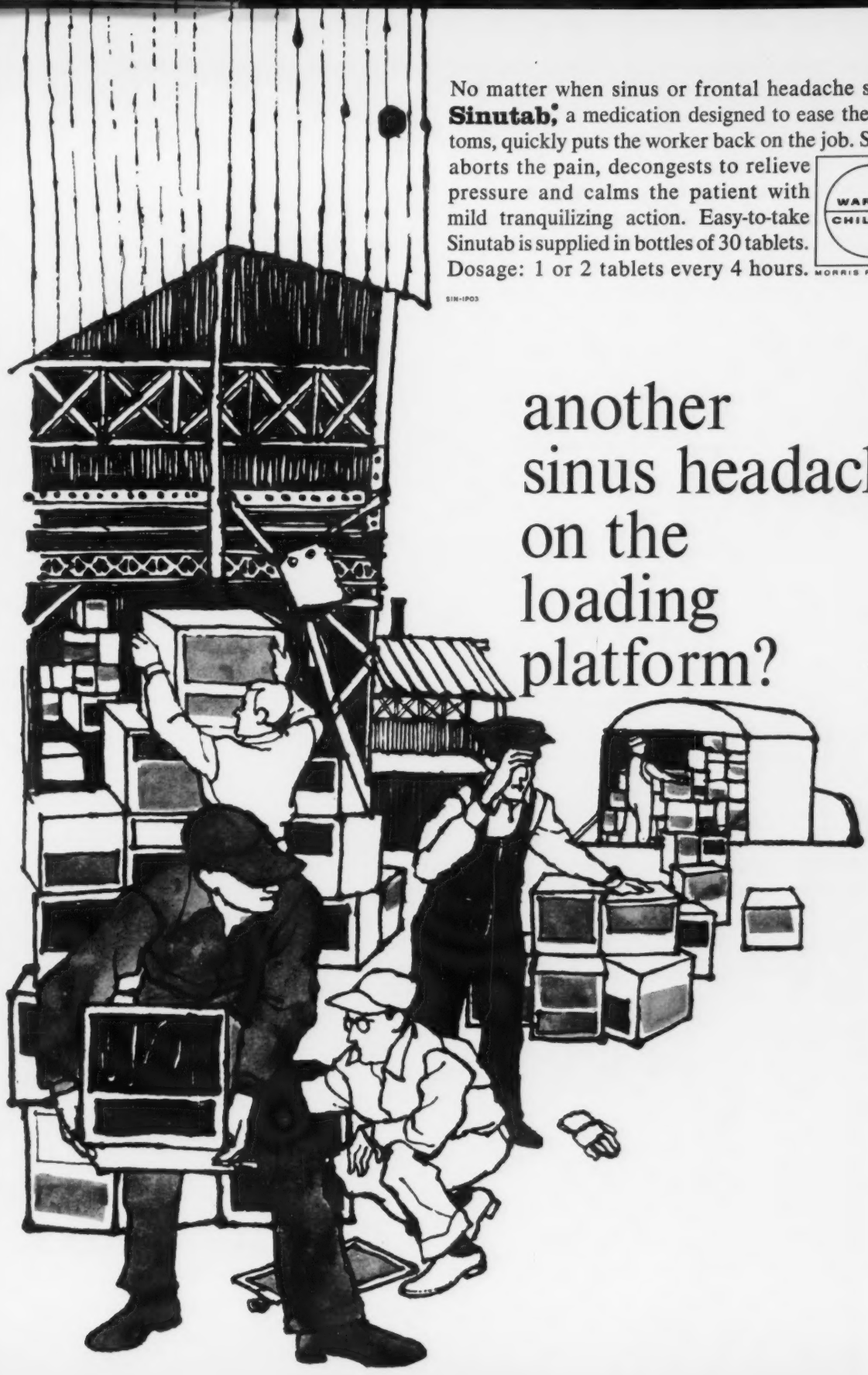

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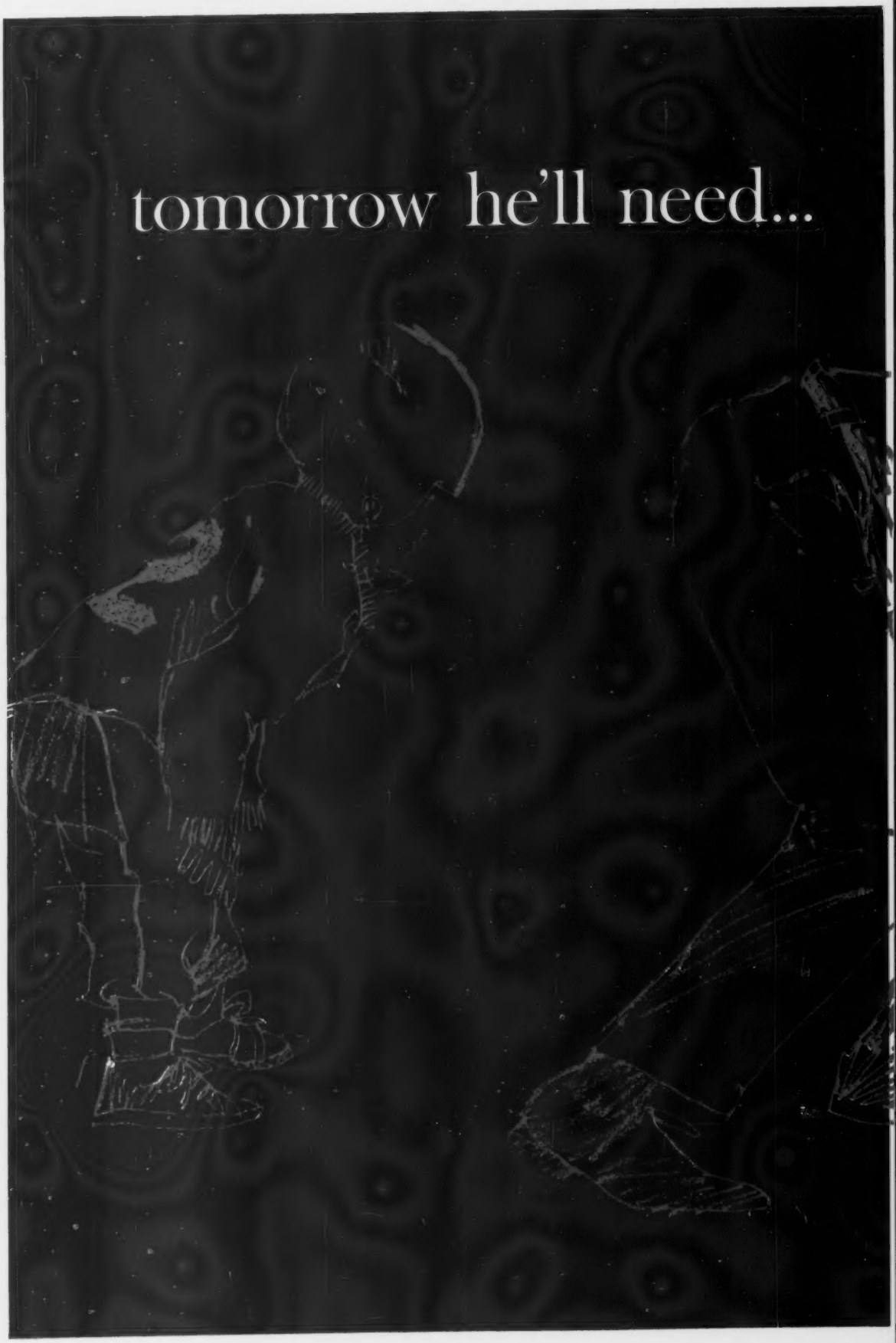

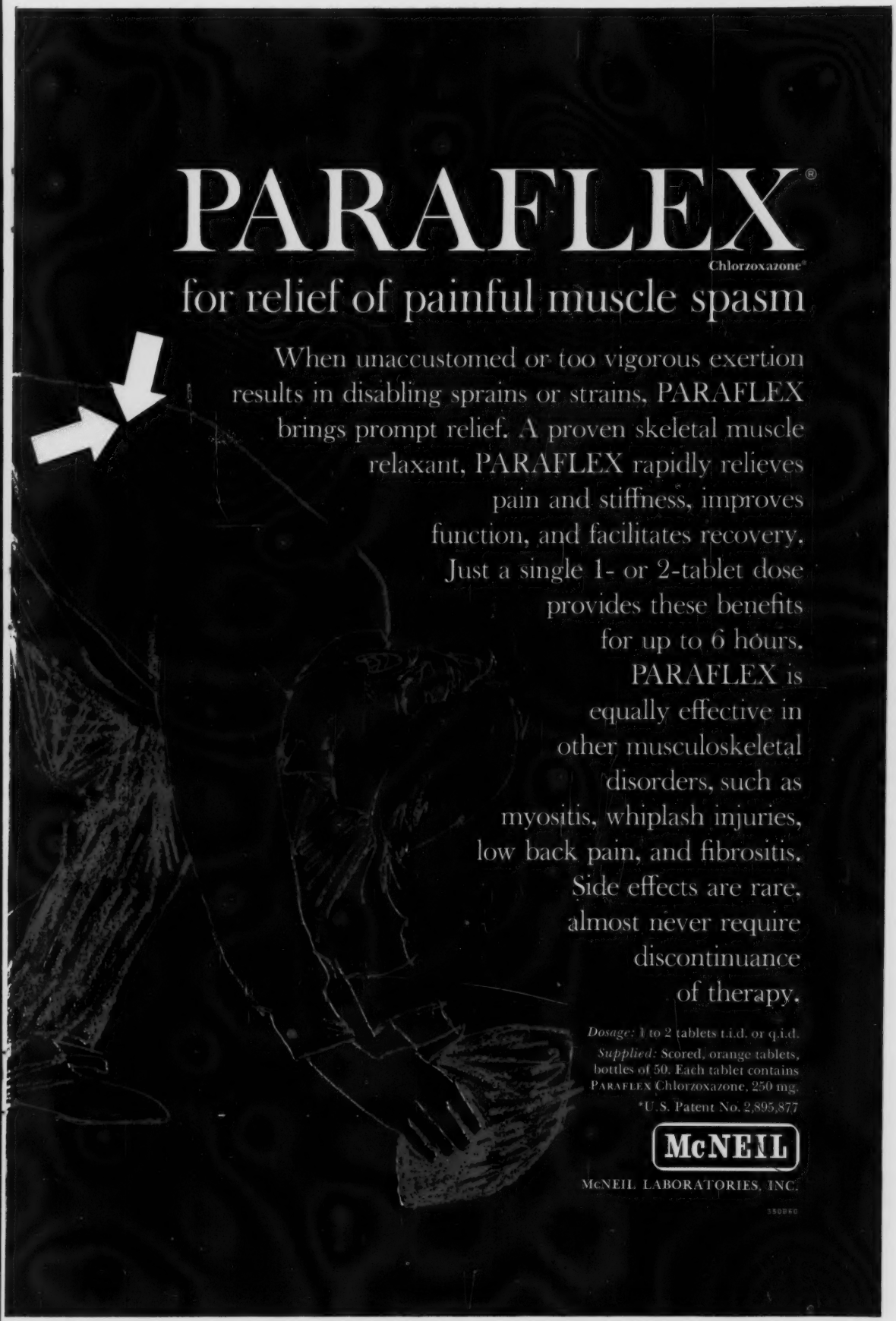
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references: 1. Blanchard, K., and Ford, R. A., Journal-Lancet, 74:433, 1954. 2. Cass, L. J., and Frederik, W. S., Am. Pract. Dig. Treat., 2:844, 1951. 3. Hayes, E. W., and Jacobs, L. S., Dis. Chest, 30:441, 1956. 4. Blanchard, K., and Ford, R. A., Clin. Med., 3:961, 1956. 5. Blanchard, K., and Ford, R. A., Rocky Mt. M. J., Vol. 52, No. 3, 1955. 6. Boyd, E. M., et al., Can. M. Assoc. J., 54:216, 1946.

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1.) Stoughton, R. B.: Report To The Council; Steroid Therapy In Skin Disorders, J.A.M.A. 170:1311-1315 (July 11) 1959. 2.) Goodman, H.: Concentration of Topical Medications Dispersed in Evaporating Vehicles with Particular Reference to Hydrocortisone Alcohol, Clin. Med. 6:781-784 (May) 1959.

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CHYMORAL PRODUCED GOOD TO EXCELLENT RESULTS IN 8 OUT OF EVERY 10 CASES WITH NO REPORTED TOXICITY OR SIDE EFFECTS[1-4]

condition	no. of cases	excellent/good	fair	no response
contusions, lacerations, miscellaneous trauma	164	137	19	8
fractures, sprains & strains	64	44	14	6
TOTAL	228	181	33	14

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Chymoral, *a new ORAL anti-inflammatory enzyme tablet* formulated especially for intestinal absorption, prevents or reduces inflammation of all types through systemic action . . . hastens absorption of blood and lymph extravasates (except of cardiorenal origin) . . . markedly and rapidly alleviates pain. The recommended dose of 2 tablets q.i.d. assures the patient of 400,000 units of enzymatic activity daily.

Each Chymoral tablet provides enzymatic activity equivalent to 50,000 Armour Units, supplied by a purified concentrate which has specific trypsin and chymotrypsin activity in a ratio of approximately six to one. Bottles of 48 tablets.

1. Billow, B. W., *et al.*: Southwestern Med. *41*:286, (May) 1960.
2. Teitel, L. H., *et al.*: Indust. Med. *29*:150 (April) 1960.
3. Beck, C., *et al.*: Clin. Med. *7*:519 (March) 1960.
4. Clinical Reports to the Medical Dept., Armour Pharmaceutical Co., 1959.

in accidental or surgical trauma

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References: Annals of Allergy, Vol. 6. July-August 1948. Study of a New Histamine Antagonist, The Pennsylvania Med. J., Vol. 51. Clinical Study of a New Antihistaminic Drug—Phenindamine. Dristan Clinical Study.

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200 mg. (green colored, scored), bottles of 100.
100 mg. (peach colored, scored), bottles of 100.

*Kearney, R. D.: Current Therap. Res. 2:127, April, 1960.

Trancopal (brand of chlormezanone) and Caplets, trademarks reg. U. S. Pat. Off.

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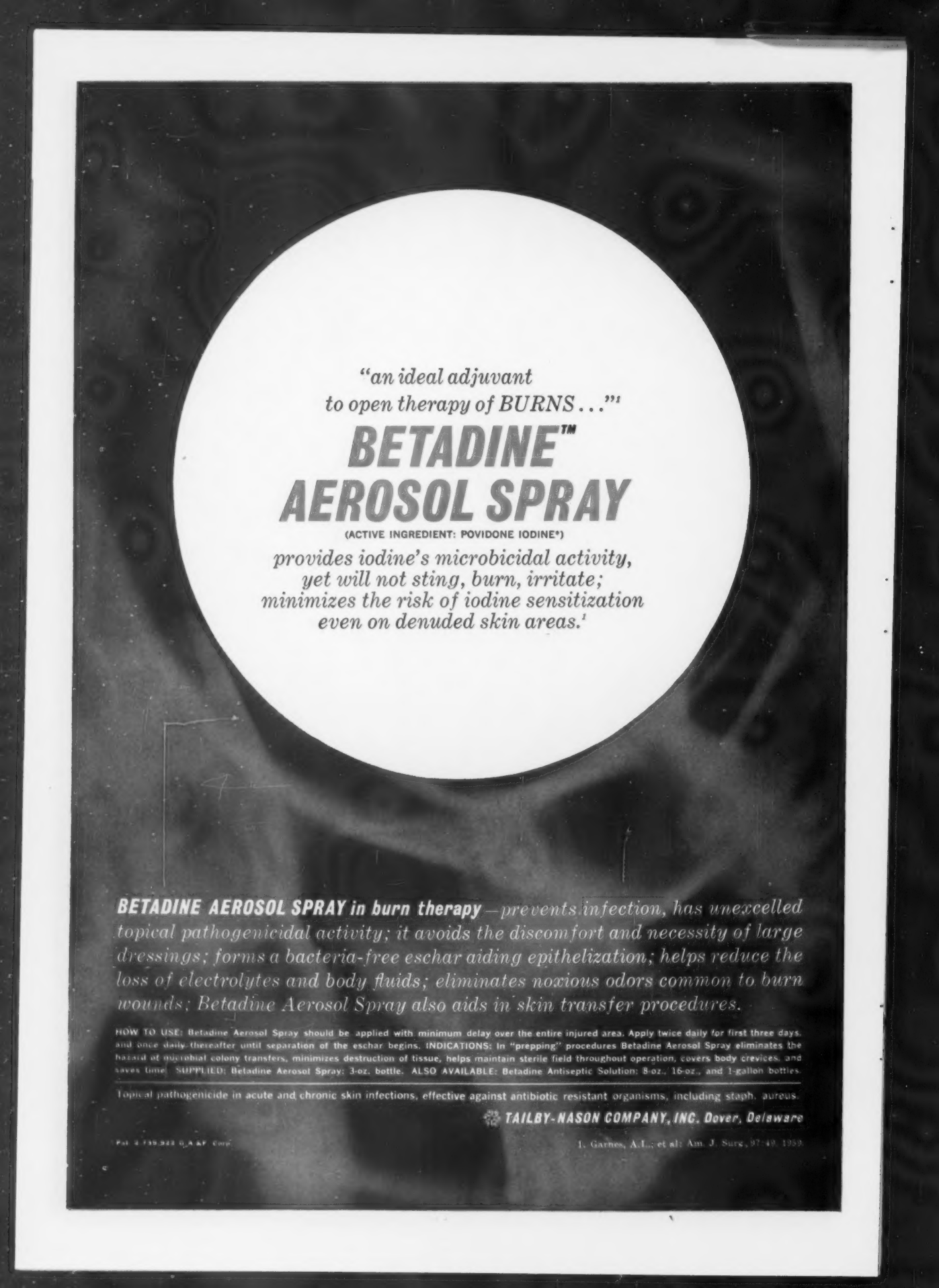
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Pat. 2,739,922 U.S.A.&F. Corp.
1. Garnes, A.L.; et al: Am. J. Surg. 97:49, 1959

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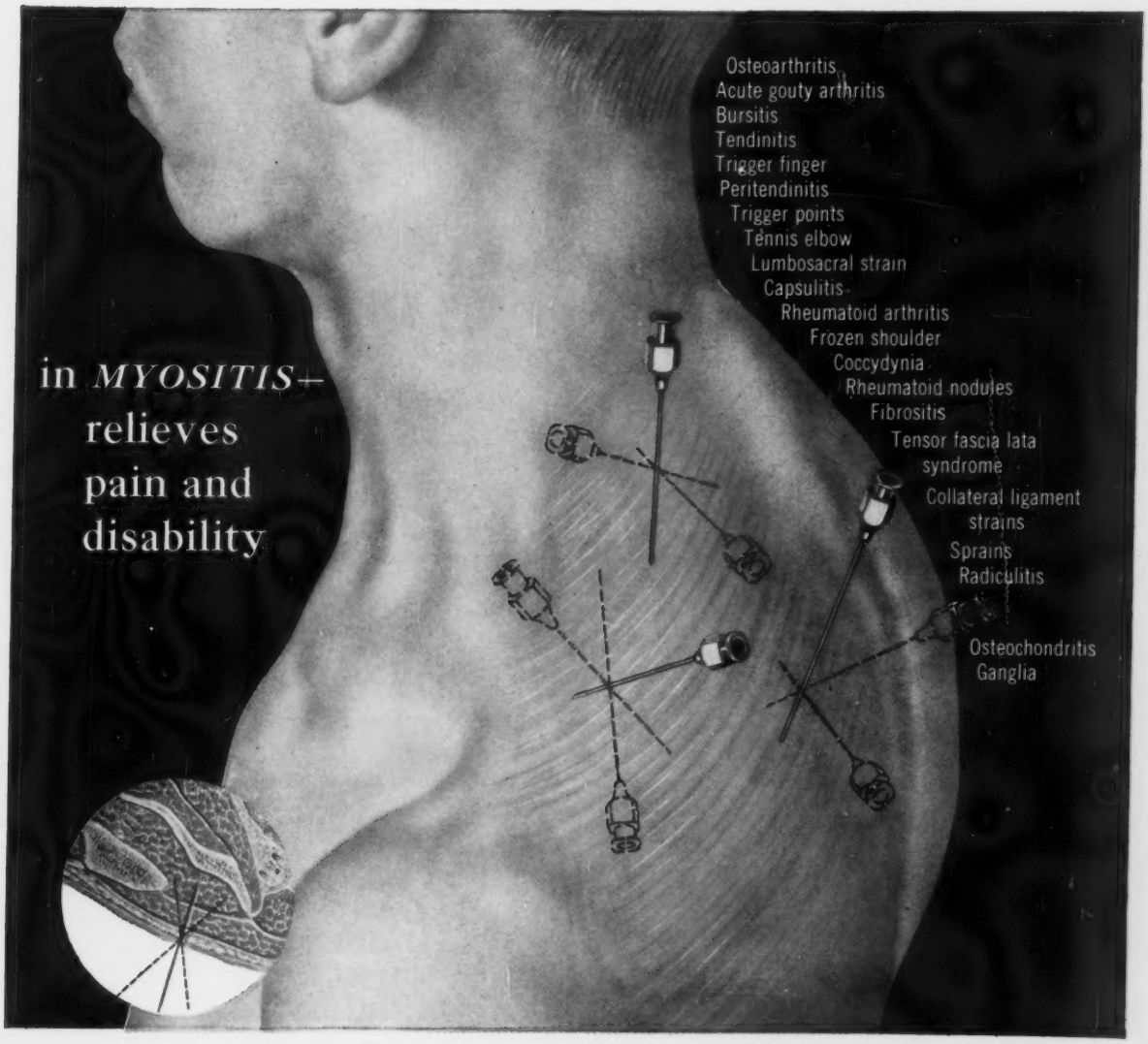

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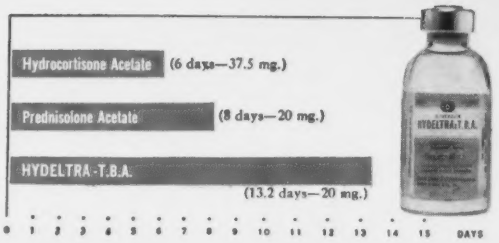
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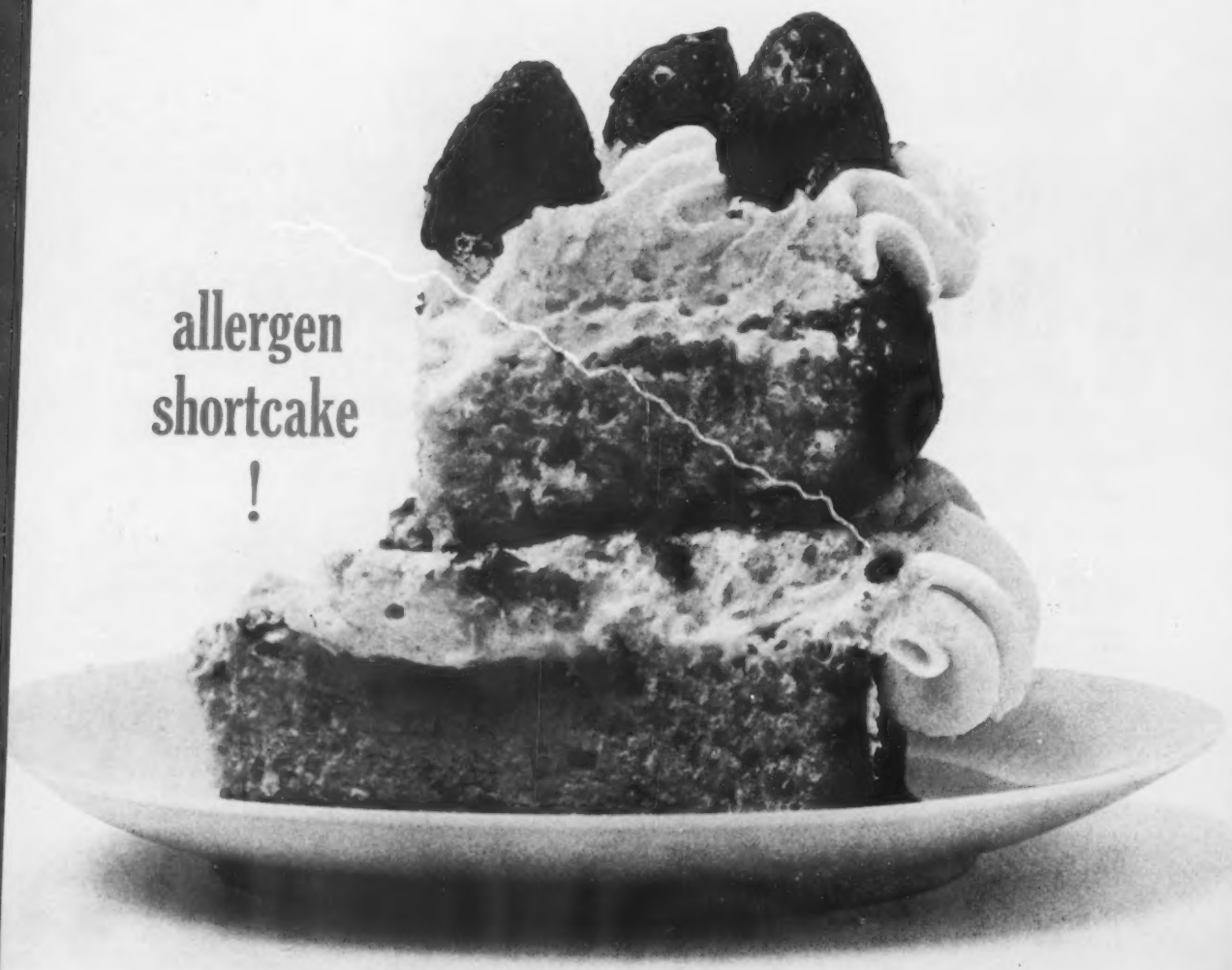

Factual Clinical Data: Male, 65, with dislocated shoulder; patient in great pain. Fifteen minutes after administration of 10 cc. of ROBAXIN Injectable, dislocation reduced on first attempt, and patient was able to move arm easily. Photographs used with patient's permission.

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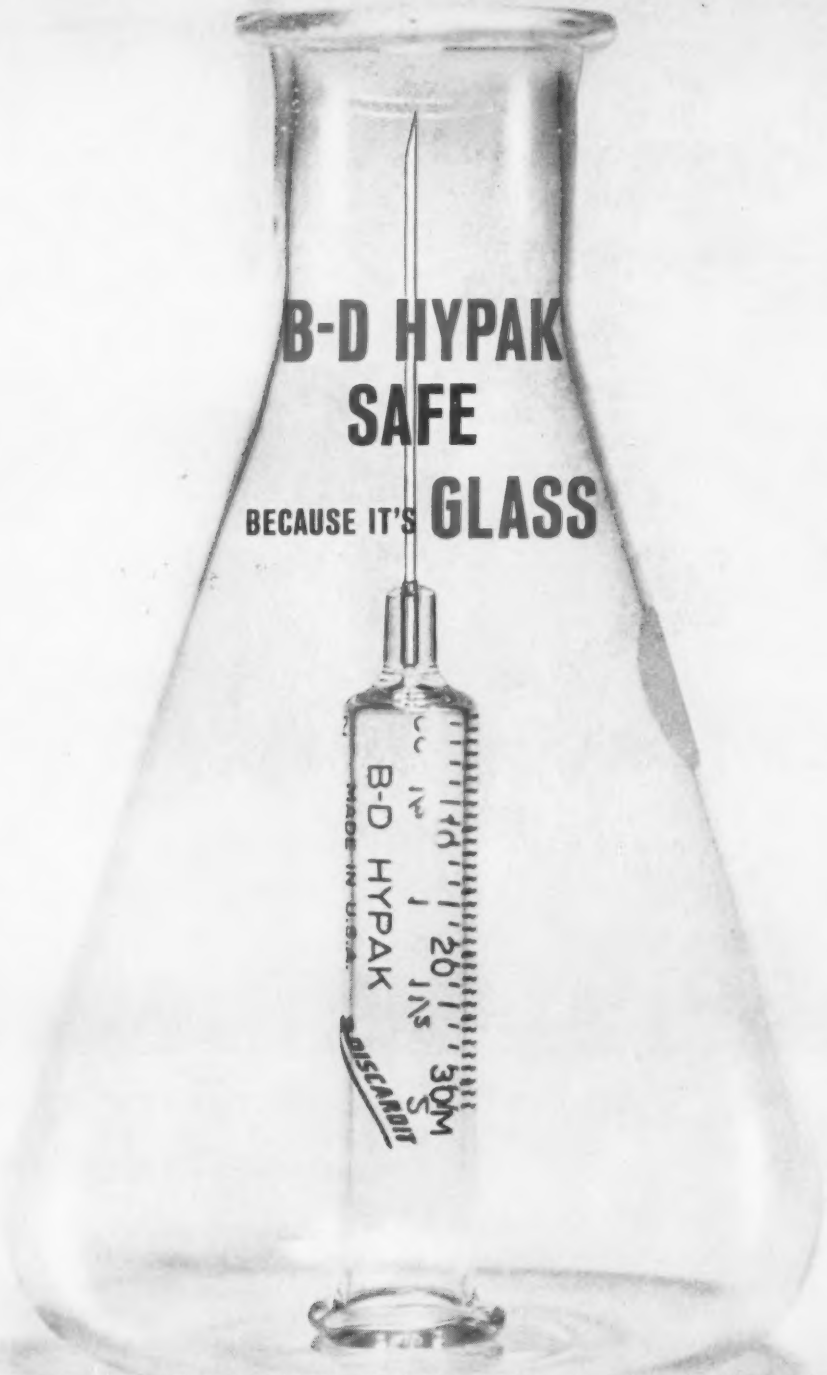
REFERENCES: 1. Carpenter, E. B.: Southern M. J. 51:627, 1958. 2. Forsyth, H. F.: J.A.M.A. 167:163, 1958. 3. Grisolia, A., and Thomson, J. E. M.: Clin. Orthopaedics 13:299, 1959. 4. Hudgins, A. P.: Clin. Med. 6:2321, 1959. 5. Lewis, W. B.: California Med. 90:26, 1959. 6. O'Doherty, D. S., and Shields, C. D.: J.A.M.A. 167:160, 1958. 7. Park, H. W.: J.A.M.A. 167:168, 1958. 8. Plumb, C. S.: Journal-Lancet 78:531, 1958. 9. Poppen, J. L., and Flanagan, M. E.: J.A.M.A. 171:298, 1959. 10. Schaubel, H. J.: Orthopedics 1:274, 1959.



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1. Crawford, O. B.: Anesthesiology 14:278, 1953. 2. Wiedling, S.: Xylocaine, The Pharmacological Basis For its Clinical Use, Stockholm, Almquist and Wiknell, 1959.

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Kestler, O.: Conservative Management of "Low Back Syndrome", J.A.M.A. 172: 2039 (April 30) 1960.

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1. Fullgrabe, E. A.: Ann. New York Acad. Sc. 68:192, 1957. 2. Jenkins, B. H.: J.M.A. Georgia 45:431, 1956. 3. Davis, O. F., et al.: Postgrad. Med. 26:719, 1959.

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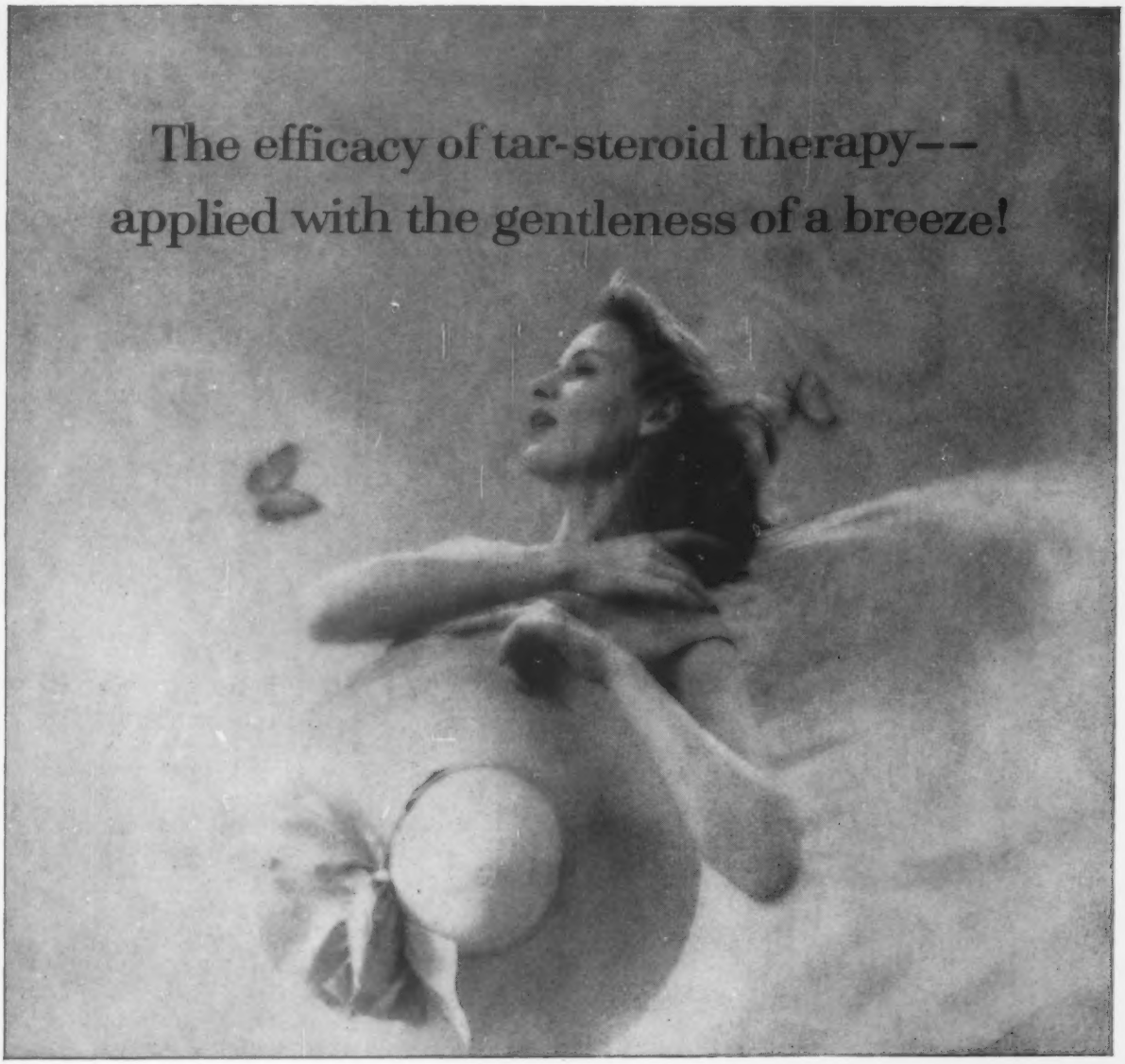

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References: 1. Bleiberg, J.: J. M. Soc. New Jersey *53*:371, 1956. 2. Clyman, S. G.: Postgrad Med. *21*:309, 1957. 3. Welsh, A. L. and Ede, M.: Ohio State M. J. *50*:837, 1954. 4. Abrams, B. P. and Shaw, C.: Clin. Med. *3*:839, 1956. 5. Welsh, A. L. and Ede, M.: J.A.M.A. *166*:158, 1958. 6. Welsh, A. L. and Ede, M.: Ohio State M. J. *55*:805, 1959. 7. Clyman, S. G.: Ind. Med. & Surg., *27*:531, 1958.

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(PARAFLEX® + TYLENOL®)

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†U.S. Patent No. 2,895,877

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*Based on 8.7% patient intolerance to salicylate therapy reported by Tebrock, H. E.: Ind. Med. & Surg. *20*:480-482, 1951.

1. Kelly, J. J., Jr.: Am. J. Med. Sci. *232*:119-128 (Aug.) 1956.

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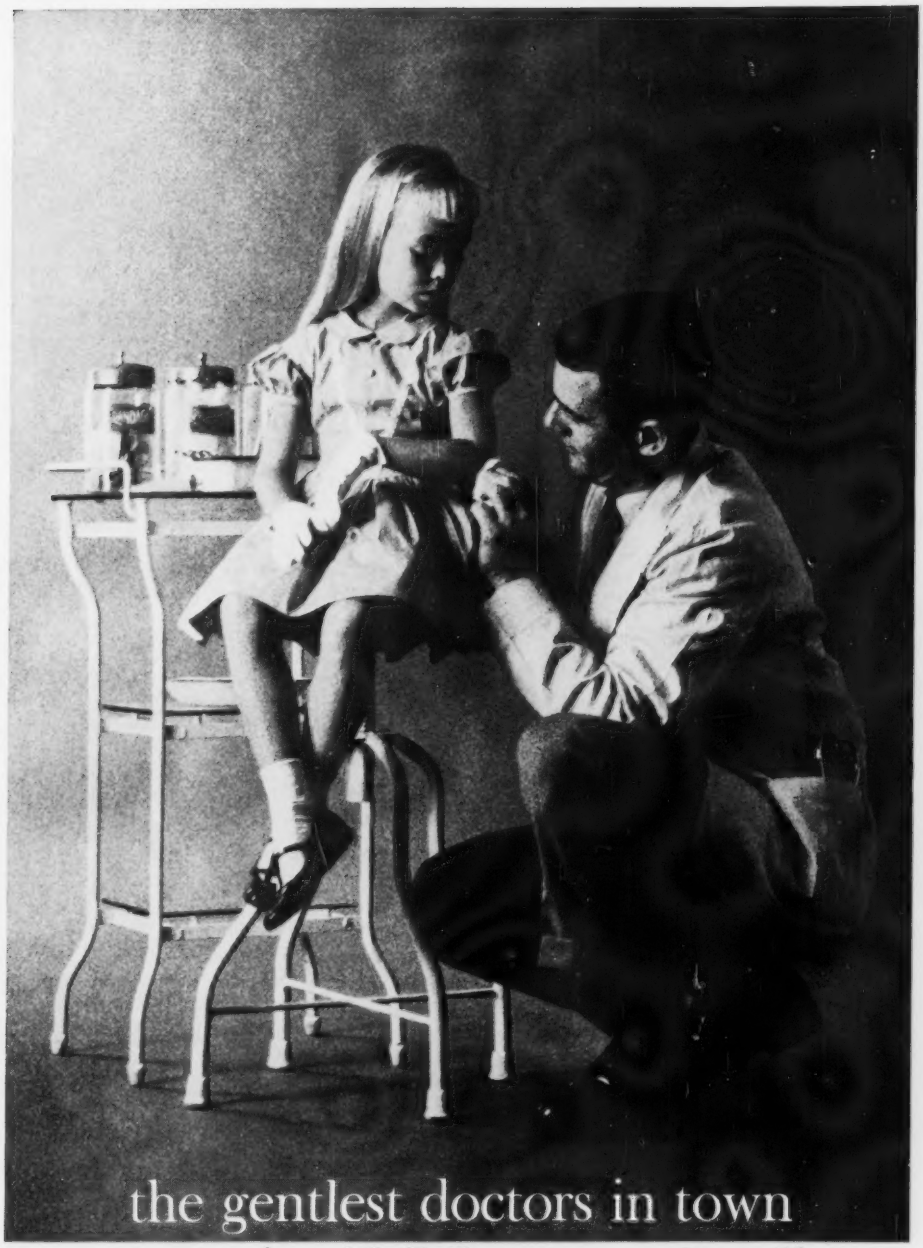

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IMS

Some Physiological Correlates of Noise Induced Hearing Loss

• MERLE LAWRENCE, PH.D.
Department of Otolaryngology and
Institute of Industrial Health
University of Michigan Medical Center
Ann Arbor, Michigan

Much has been written about the permanent and temporary effects of noise on the sensitivity of hearing. But still a great deal of mystery seems to exist about the specific relationship between loud sounds and hearing loss in individual cases. One of the main reasons for this is the lack of factual information relating audiometric measures of hearing loss to the actual pathologic condition of the ear following acoustic insult. The problem boils down to the following questions: How can one be sure that a certain noise is producing what will eventually be a permanent hearing loss in a certain individual, and how can one be sure that noise is responsible for an existing hearing loss? More than likely, the answer to the latter question will never be more than circumstantial, except that the establishment of the true extent of presbyacusis for individuals who have never been subjected to overstimulating noise may provide some clarification.

To be certain that noise is producing a permanent hearing loss is equally difficult. There are, of course, some noises that will damage all ears and some of low intensity that will do no permanent harm to any ear. The mysteries lie in between these levels, and the purpose of a conservation of hearing program is to protect the hearing of as many workers as possible without placing unwarranted restrictions upon noise-producing machinery. This report is not designed to discuss a conservation of hearing program but rather to present some observations on the physiological effects of noise on hearing. For those interested in knowing the best procedures, as of this date, for preventing noise induced hearing loss there is nothing better than the "Guide for Conservation of Hearing in Noise" issued by the Subcommittee on Noise of the Conservation of Hearing Committee, American Academy of Ophthalmology and Otolaryngology. In this guide the subcommittee says that "A hearing conservation program should be considered whenever persons have (1) difficulty communicating by speech while they are in the noise, (2) head noises or ringing in their ears after working in the noise for several hours, or (3) a loss of hearing that has the effect of muffling speech and certain other sounds after several hours of exposure to the noise. (This hearing

From the Physiological Acoustics Laboratory, Department of Otolaryngology and Institute of Industrial Health, University of Michigan Medical Center.

The studies upon which this report is based were supported, in part, by a contract from the Research and Development Division, Office of The Surgeon General, Department of the Army, under Contract No. DA-49-007-MD-634. Presented at the 22nd annual General Motors Medical Conference, April 25, 1960, Rochester, New York.

loss is transient and usually disappears in a few hours.)"

If some action is taken when the above symptoms show up, many cases of noise induced hearing loss may be prevented. Because this kind of hearing loss is an actual physical damage to the auditory sensory cells it is of interest to examine the significance of the statements made in the above quotation.

The last two statements imply that there are some insidious temporary effects of noise that pass away if the individual is kept in quiet but become cumulative and damaging if repeated. These short duration shifts in threshold have been measured in many different experiments by many different people. An example of such a measure[1] is shown in Figure 1.

One ear of each of six observers was presented a tone, in this case 1000 cps, for one minute and the shift in threshold and time to recover the normal level (as compared to that before overstimulation) was determined by means of an automatic audiometer.[2] When the observer heard a tone he pressed a button on a hand-held switch which automatically started the tone decreasing. As soon as the tone disappeared the button was released and the tone automatically increased in intensity. Again as soon as the tone was heard the button was pressed, etc. The record of the increasing and decreasing tone was kept by a recording stylus on a moving strip of paper. In this way a continuous check on the shifting threshold was kept.

The earliest poststimulation record that could be obtained was six seconds after cessation of the steady tone. It can be seen that there is a shift of 10 to 15 db six seconds after the 1000 cps tone was turned off. The return to normal takes about one minute. The amount of shift and recovery is practically independent of intensity.

The question is: Is this temporary threshold shift (TTS) at all related to noise induced hearing loss?

We can, for the sake of convenience, divide the ear into two areas where events can take place that might be responsible for this TTS. One is in the nerve fibers and the other is in the organ of Corti, the locus of damage caused by noise. So our question can be phrased another way: Is this temporary threshold shift related to the activity of the organ of Corti?

The answer to this question is that the TTS does not always reflect the condition of the organ of Corti. At all stimulation levels changes along the nerve pathways cause a TTS; at higher levels there is an effect upon the organ of Corti that is superimposed upon that caused by the nerve. The TTS is never a pure measure of changes within the organ of Corti.

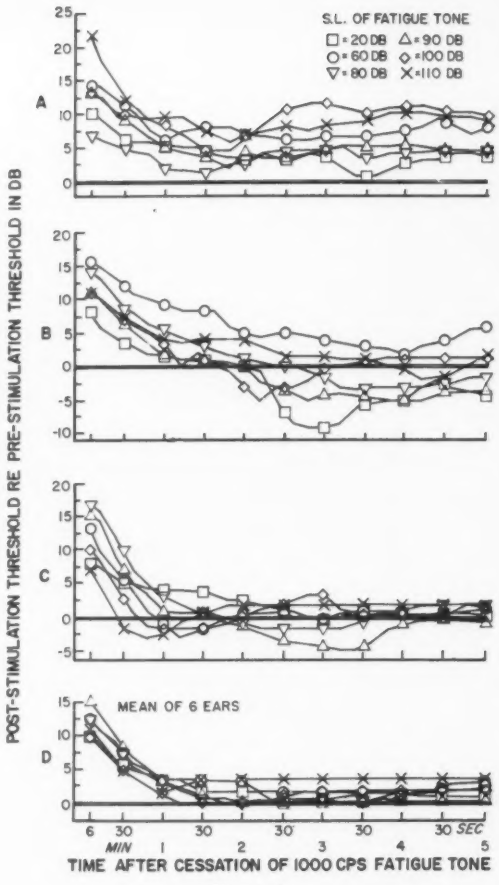
S.L. OF FATIGUE TONE
□ = 20 DB △ = 90 DB
○ = 60 DB ◇ = 100 DB
▽ = 80 DB × = 110 DB
A
B
C
D
MEAN OF 6 EARS
POST-STIMULATION THRESHOLD RE PRE-STIMULATION THRESHOLD IN DB
6 30 30 30 30 30 SEC
MIN 1 2 3 4 5
TIME AFTER CESSATION OF 1000 CPS FATIGUE TONE

Figure 1

Temporary threshold shift (TTS) and subsequent recovery at 1000 cps following one minute of the same frequency at the indicated levels. Graphs A, B, and C are for different ears to show the extent of individual differences. Each point on graph D represents the average threshold shift for six ears. The random individual fluctuations tend to disappear. From reference 1.

There is a very clear way in which this can be shown. The technique of recording the electrical a. c. potentials that arise from the organ of Corti demonstrates the functional condition of this sensory area as well as the ease of sound conduction from the external ear to the seat of the electrical response. These can be recorded, after suitable amplification, from an electrode placed in the vicinity of the cochlea. The action potentials of the nerve can be completely filtered out so that it is possible by this method to determine organ of Corti responses separately from those of the nerve.

Figure 1 has shown that audiometrically there is a TTS of 10 to 15 db following only one minute of a 1000 cps stimulation at just about any level

above threshold. Rahm, Strother, and Gulick,[3] on the other hand, recorded the electrical output of the cochlea in response to a continuous 1000 cps tone for as long as 85 hours. As long as the stimulus was kept below about 68 db (re .0002 dyne per sq. cm.) the variation in electrical response was never more than one or less than 4 db beyond that at the beginning.

The difference between the audiometric measures and the electrical measures must be that the former measures the response of the entire auditory system while the latter is restricted to the peripheral mechanism up to the generation of the potentials. Since it has been clearly established that no changes occur in the conductive apparatus, at least up to intensities that would destroy the ear, any changes that should exist in the organ of Corti response could be expected to occur in the organ of Corti.

We can demonstrate this further by deliberately overstimulating the ear and comparing audiometric and electrical measures.

Figure 2[4] presents audiograms made with an audiometer similar to that used for the TTS experiment except that rather than determining threshold for a single frequency, the frequency was swept from 500 to 5000 cps while the threshold was being measured. This audiogram was of a subject's hearing immediately following the presentation of a 1000 cps tone at 122 db above .0002 dyne per sq. cm. for seven minutes. In the upper audiogram the frequency was swept from low to high. Since it was possible that the lower frequencies had fatigued the ear to higher frequencies, the subject's ear was again stimulated with the same frequency and intensity one month later after full recovery had taken place, and a high-to-low sweep-frequency audiogram taken immediately afterwards. This is shown in the lower audiogram. With slight variation the same pattern shows up in both; the maximum threshold shift has not occurred at the frequency of stimulation but approximately one octave higher. This observation has been made before and does not really concern us here, but the fact that the shift is sharply notched is of interest.

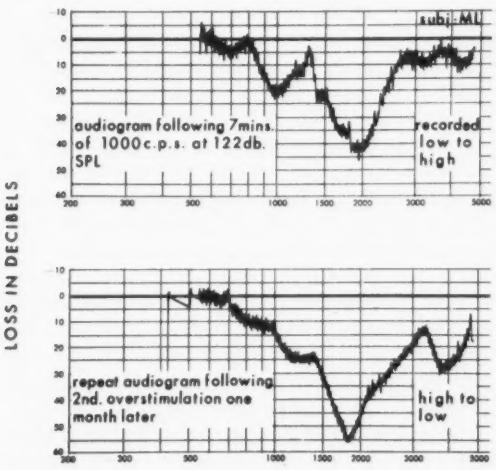
subj. MU
audiogram following 7 mins. of 1000 c.p.s. at 122 db. SPL
recorded low to high
repeat audiogram following 2nd. overstimulation one month later
high to low
LOSS IN DECIBELS

Figure 2

Sweep-frequency audiograms following the indicated overstimulation. The lower audiogram was made to check the possibility that the sweep frequency notch an octave above the overstimulating frequency was not the result of fatigue for the higher frequencies as the low frequencies were being swept through. From reference 4.

Figure 3 shows an electrical audiogram recorded from a guinea pig after the identical degree of stimulation: seven minutes of 1000 cps at 122 db above .0002 dyne per sq. cm. In this instance there is a generalized loss, greater for the middle frequencies than for the extreme lows and highs. Similar results have been shown before.[5] No specific frequency shift as shows up in the audiometric examination of the human ear appears in this organ of Corti response. There are only two points of general similarity: the center frequencies suffer a greater loss than do the extreme lows and highs and the higher frequencies are hurt more than the lows. Extensive experimentation has shown that these results are not the result of technique.

Obviously the neural pathways do something extra with the organ of Corti response. This is what Békésy[6] has called "funneling" in the nervous system and need not concern us here. Suffice it to say that, obviously, one cannot tell exactly what has happened to the organ of Corti purely by an audiometric threshold measure.

One can, however, by recording the electrical

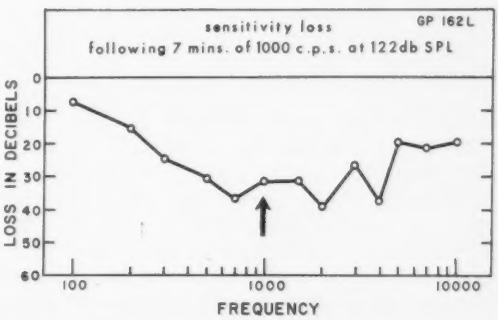

Figure 3

Electrical audiogram made by recording the cochlear potentials with a platinum-foil electrode on the round window and an indifferent electrode in the temporalis muscle. The curve shows the loss at various frequencies following overstimulation at a frequency (arrow) and intensity identical to that of Figure 2. From reference 4.

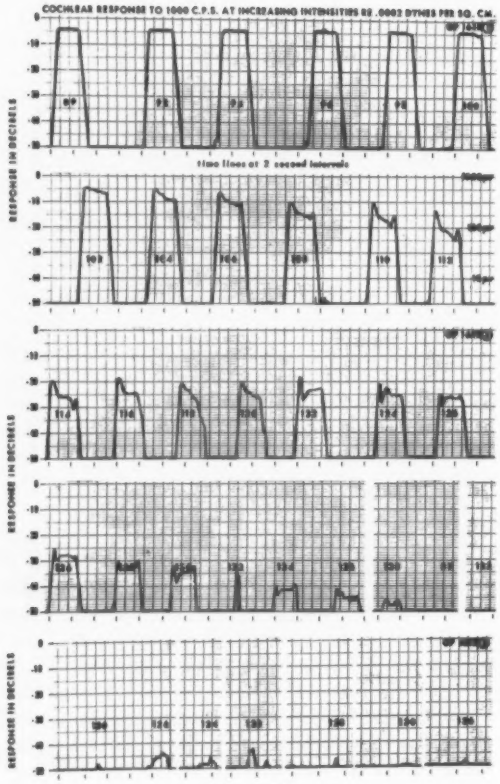

Figure 4

A sweep-amplitude record of the response to 1000 cps as the sound intensity is increased by 2 db steps for each presentation. The rise time is one second and the tone holds at its top intensity for two seconds. As the response gets increasingly smaller the actual sound is getting more and more intense which, in this case, has completely damaged the ear for this frequency. From reference 7.

response, determine with a great deal of accuracy the exact effects of excessive sound upon the organ of Corti. As shown by Rahm *et al.*, the sound may be kept stimulating the animal's ear for as long as the animal can be maintained, with no serious loss in response. As the sound level is raised, however, the response reaches a maximum output and further increases in sound cause a decrease in electrical response. At this point temporary damage is being produced in the organ of Corti. A measure of the response at low levels of sound intensity, if repeated after a loud burst of sound, shows a loss of sensitivity. The animal may recover from this but two things can make it permanent: repeating many times the sound that has produced the temporary loss before full recovery from a preceding stimulation has occurred, and making the first burst of tone loud enough. Audiometrically, of course, such events would show up but there would be superimposed the shift caused by the neural elements.

It is interesting to study the electrical response as the sound is raised through levels which cause further decreases in the ouput of the ear. At these levels the ear is severely overloaded and injury rapidly ensues.

In studying this injury process with increasing tones the tone used to determine the function of the ear also has an effect so it must be kept as a short burst. By keeping a continual running-time record of the ear's electrical output it is possible to record not only the effects of increasing intensities but the cumulative effect of repeated bursts of sound. Figure 4[7] presents the response to a 1000 cps tone as its amplitude is swept increasingly in steps of 2 db above the region of maximum response and held for about two seconds. At a sound pressure level of 89 db the response holds at a maximum of 630 microvolts. Increasing the intensity in the next presentation by 3 db does not change the level of response. When the sound is raised two more db, however, and held for two seconds there is seen a slight drop in response after the first second. As the tone is increased by 2 db steps the response goes up to a constant level, but the immediate fall off becomes more noticeable until a sound intensity of 106 db is reached. Here is seen the first significant drop in the initial rise which now attains 450 microvolts. At 114 db the initial rise is 100 microvolts and the remaining portion shows a drop and secondary rise. At 120 db the initial rise increases a little but then the response slopes off rapidly, while above this level there is a steady falling off of the initial rise with a decrease and second rise in the following two seconds. The response has dropped to a level of 10 microvolts when a sound pressure of 134 db has been reached and at 138 db only 5 microvolts can be attained. Repeating some of the earlier levels of stimulation now produces very little response; no potentials greater than 10 microvolts can be obtained with any level of sound. The immediate fall off in response has been studied more thoroughly and has been found to be a definite part of the inner ear response and is not due to contraction of the middle ear muscles.[8]

The onset of injury can be studied much more closely by recording the response continuously as the tone is increased by one db steps. As shown above, when the tone is intense enough, each increase in sound intensity causes a further decrease in response. What we would like to know in this experiment is whether this response continues to decrease until the ear is completely injured or whether there is some stimulation intensity where the organ of Corti just "gives

up," perhaps signifying an actual physical breakdown.

The following experiment involved an ear whose response was previously depressed by overstimulation. Shown in Figure 5 is the running-time record of the recorded potentials produced by a tone of 1000 cps both at and above the region of maximum response which, in this instance, amounted to only 30 microvolts. As the tone was increased by one decibel steps beyond the maximum, the level of response decreased by about the same amount until at +3 db there was a break and the response dropped 5 db. Raising the sound level one more db to 4 db above that which gave a maximum produced a further drop of 12 db or a response 17 db below the maximum. Apparently the +1, +2 and +3 db steps were not injury but represented a decrease in response because of the severe overloading of this partially damaged system.[9] At a rather specific point, however, further drastic injury occurred as evidenced by the sudden decrease in response and the failure of the maximum to be produced as the level of sound was decreased. As the tone was reduced 1 db at a time, as shown in the lower tracing in the figure, there was an increase in response which never reached the previous level. The response to the second +3 db sound level was then down 11 db from the first +3 db reading; that of the +2 down 18 db from the previous and the +1 db and maximum down 5 db. It appears as if an overloading characteristic and an injury of about 5 db were combined at the +3 and +2 db stimulus levels; the end result obviously representing the influence of the test tone upon the residual capabilities of the inner ear.

Aside from the injury caused by the intensity of the sound, it is obvious from Figure 4 that duration of the tone when at a certain overloading level is equally important in bringing on the onset of injury. Referring again to Figure 4 it can be seen that at 89 db the maximum is maintained for the duration of the tone while at 104 db, even though the maximum level of response is attained on the initial rise of the tone, the response immediately began to drop. The next experiment was carried out to see if there would be a sudden breakdown of function for long-lasting tones at this high intensity.

Figure 6 shows the results of such an experiment using the same method of recording as that used to produce the results of Figure 5. A tone of a sound pressure level of 74 db gave a response of about 300 microvolts which held at this level. After a brief period of time, raising the tone to +94 db increased the response only 4 db. At this level the ear was extremely overloaded but the response did not drop. Momentarily raising the sound level of the tone to +104 db caused a sharp drop so the tone was returned to +94 db. It can be seen that this brief stimulus brought on a slight drop in the maximum which remained at 700 microvolts. The response held at this level so the tone was raised to +104 db. This brought about a decrease in electrical output. Raising the stimulus level to +114 db dropped the response to 30 microvolts. Maintaining this level of stimulation seemed to have

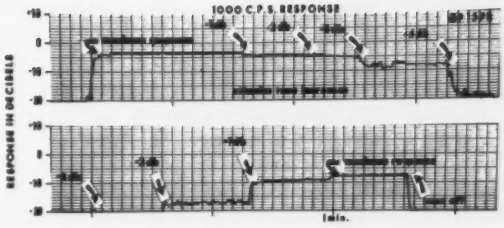

Figure 5

A running-time record of the response to 1000 cps as the sound is first increased by 1 db steps then decreased by the same amount. The increases of 1 db at the +3 db and +4 db points cause a sudden break in response. This ear has previously been overstimulated so that the maximum is down to 30 microvolts. From reference 7.

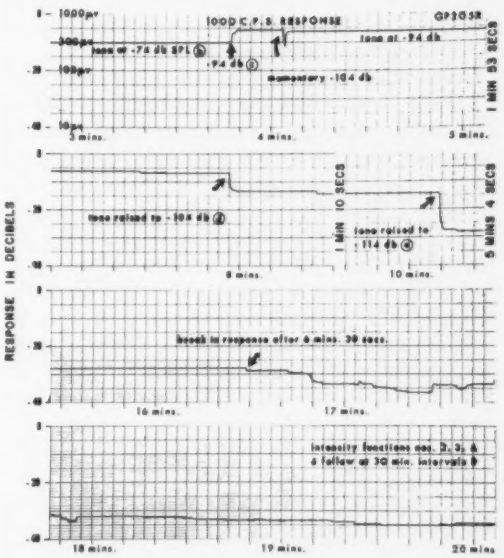

Figure 6

A running-time record of the response to 1000 cps as the stimulus at different levels is left on for a period of time. A break in the response comes after the tone at +114 db had been left on for six and one half minutes. At (b) the ear is not overloaded; at (c) the ear has reached its maximum voltage output; at (d) the ear is greatly overloaded producing a diminished response, and at (e) these conditions are extreme. From reference 7.

no further effect until six and one half minutes had passed at which time there appeared a sudden break in response. As shown in the recording, the response following this point became noticeably variable and continued to decrease somewhat until termination of the recording.

The data of Figures 5 and 6 show that what is probably a permanent loss of function comes on rather suddenly both with increasing stimulus level and with tone duration. The sudden breaks in response brought on by intensity and duration probably represent severe injury from which the ear might never recover. No clear notion exists to explain the nature of the temporary loss in organ of Corti response. It seems obvious that an organ of Corti whose function is depressed as the result of previous overstimulation is more susceptible to further depression than a normal ear. But we know nothing about the recovery process or what factors are responsible for the functional recovery of some ears and not others.

In the course of some experiments on the individual differences in functional recovery and structural repair in overstimulated guinea pig ears,[10] we found that some animals were capable of full recovery from overstimulation while others suffered a further loss even though the overstimulating noise was equated as accurately as possible in all the experimental animals. These animals were divided into two groups, each of which was stimulated by a different level of noise. As examples of one aspect of the results obtained, two animals from one of the groups have been selected to present here.

These animals were first tested in one ear for sensitivity. That is, at each of 12 frequencies, 100, 200, 300, 500, 700, 1000, 1500, 2000, 3000, 5000, 7000 and 10,000 cps, the sound pressure at the tympanic membrane necessary to give a response of one microvolt at a round window electrode was determined. The same ear of the animal was then subjected to a noise generated by a General Radio type 1390-A Random-Noise Generator. Those animals in the group considered here received an over-all noise level of 136 db above .0002 dyne per sq. cm. as measured at the drum membrane.

Following 20 minutes of this stimulation there was a short waiting period for the electrical response of the animal to settle down, after which the sound pressure required to produce one microvolt at each of the 12 frequencies in the same ear was again recorded. The operative wound was closed and the animals allowed to recover for a period of 56 days at which time the previously stimulated ear of each animal was again operated upon and the sensitivity measures recorded for the third time.

While the animal was still deeply anesthetized

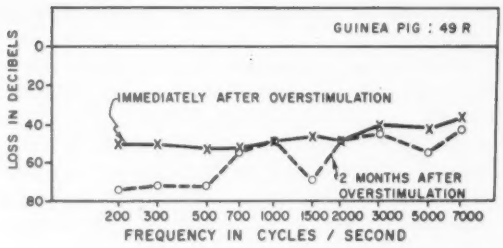

Figure 7

Electrical audiograms from a guinea pig (49R) stimulated with 136 db of white noise for 20 minutes. There is a further loss in electrical output two months after the overstimulation. From references 10 and 11.

following this last set of recordings the chest cavity was opened and the head region perfused with warm saline and Maximow's mercuric-dichromate-formaldehyde solution. Both temporal bones were removed and processed for celloidin embedding. By carrying both temporal bones through the histological processing, the unstimulated ear of each animal served as a control for the other, stimulated, ear of the same animal. Each bone was sectioned at 20 microns, and every fifth section stained in hematoxylin and eosin and mounted in serial order. A careful microscopic study was made of all structures composing the organ of Corti and scala media from base to apex in both ears of each animal. A graphic reconstruction was made of each ear together with tabulations of all abnormalities in structure.

Figure 7 shows the electrical audiograms of a guinea pig (49R) of this series taken immediately after overstimulation and again two months later. The initial loss amounted to around 55 db for all frequencies. During the next 56 days, however, there was a further loss.

Figure 8 shows electrical audiograms from another guinea pig of this same group (48R). The measures were also taken immediately after overstimulation and again two months later. The initial loss in this animal was quite similar to that of animal 49R in that it amounted to around 55 db for all frequencies. However, within the next two months the function of the organ of Corti, as determined in this manner, returned almost to normal. Here are two animals of the same age and size, overstimulated in as nearly the same manner as possible, and yet one recovered the organ of Corti function and the other continued to lose. A further investigation of these ears could throw some light on the problem of poststimulation recovery.

Of the animals in this group, 10% maintained the same sensitivity during the 56 day post-stimulation period, 30% became less sensitive

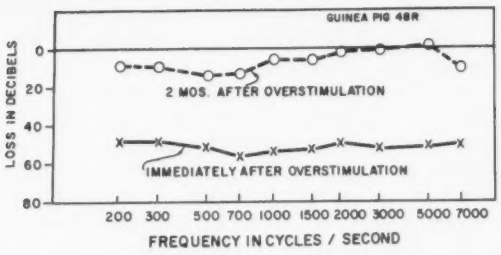

Figure 8

Electrical audiograms from a guinea pig (48R) stimulated with 136 db of white noise for 20 minutes. There is almost complete return to normal of electrical output two months after the overstimulation. From references 10 and 11.

and 60% showed various degrees of recovery. One cannot, of course, infer that these figures apply to the human being, but they certainly do indicate that it is not to be expected that all individuals if removed from a noisy environment will regain some of their lost sensitivity.

Histological examination of the ears of guinea pigs 49R and 48R revealed that 49R had at the time of perfusion extensive damage to the organ of Corti while 48R showed very little. In the region of maximum damage 49R showed a rupture of Reissner's membrane which showed signs of repairing itself along the edges of the tear.

A typical picture of such repair is shown in Figure 9. The photomicrographs portray sections of a turn of the cochlea proceeding by 0.1 mm steps from near the midpoint of the basilar membrane toward the apex. Pictures (A) and (B) show the newly formed scar which finally closed the gap between scala vestibuli and scala media. In (B) the membrane is thick and vascular, but as we proceed toward the apex by two or more 0.1 mm steps we see that the scar thins out until, in picture (D), it is as thin as a normal Reissner's membrane but is attached way above the normal point of attachment at the top of the stria vascularis. This indicates quite clearly that this thin partition between the two scalae is a regenerated membrane. The break in the basilar membrane at this point may be an artifact of the histologic processing and has not been considered part of the picture resulting from the overstimulation.

No evidence of any break in Reissner's membrane could be found for ear 48R and histological examination of this ear showed it to be in good condition. Since there was about a 40 db functional recovery for all frequencies, one wonders what these structures looked like immediately after stimulation. There is the suggestion here that an intact Reissner's membrane is essential to any marked functional recovery of the organ of Corti.

The study from which these examples have been taken shows that the individual differences seem to be related primarily to an ability of the structures of the ear to recover from an insult. The greater the initial exposure, the greater the loss, in general, but some animal's ears may show a greater loss than others. This is the first stage of the individual differences, but this amount of initial loss in any ear does not indicate whether the ear will recover or lose. There is superimposed an ability, or lack of an ability, to recover.

It was demonstrated further in these experiments that this recovery, in those ears in which recovery took place, proceeded at the same rate regardless of the degree of initial loss following the trauma. This has bearing on studies which try to relate, as a psychophysical measure, rate of recovery of normal threshold following the TTS pursuant to a period of overstimulation in the human ear. It is clear, as mentioned earlier, that threshold shifts produced by low-level sounds are not the result of changes in the organ of Corti. Only when the sound level is quite high (or possibly left on for long periods of time) does the organ of Corti, the seat of traumatic injury, show a change in sensitivity, and in these instances the recovery rates are the same. Inequality of recovery rates as measured audiometrically cannot be relied upon to reflect changes in the organ of Corti in the light of these experiments.

It would appear that a most important determinant of whether permanent hearing loss will result from an initial threshold shift following intense noise stimulation is the physio-

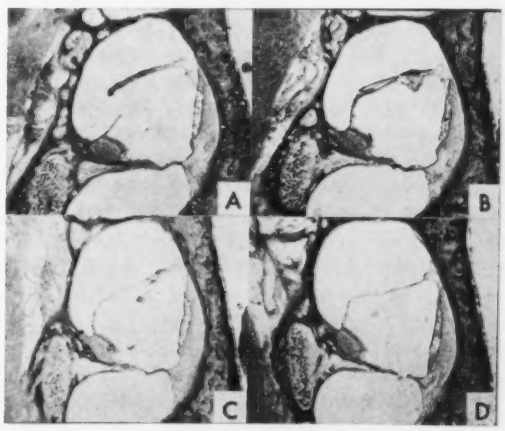

Figure 9

Repair of Reissner's membrane seen in guinea pig ear at edge of rupture produced by acoustic overstimulation which has caused disappearance of organ of Corti. A, B, C and D show progressive changes proceeding from ruptured area to region of healed membrane. From references 10 and 12.

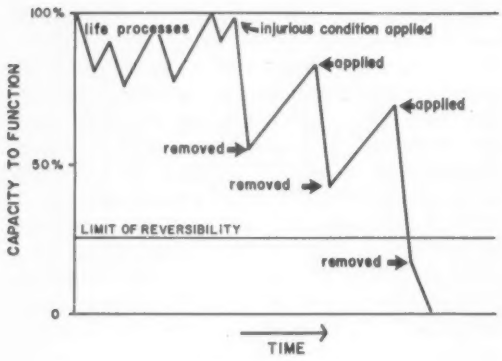

Figure 10

A schematic representation of the changes in the ability of a specialized cell system to function as some injurious condition is superimposed upon the normal life process of the tissue. From reference 7.

logical condition of the organ of Corti at the time of insult.

Living tissues of the body do not always stay at the same functional level. There is a constant ebb and flow of ability to perform and this characteristic has been described as a continual interplay between life and death processes within the cells. In Figure 10 a diagrammatic presentation of this cycle is shown. There is represented at the left-hand end of the saw-toothed curve the varying capacity to function as the life processes go on within the tissue. At a certain time some injuring condition arises and the functional capacity begins to fall, but upon restoration of the normal condition the tissue gradually recovers; the rate of this being determined by the extent of the injury and the nature of the environment in which the tissues must recover. If, during the recovery process, the injurious condition is again applied, the recovery will be halted and functional capacity again deteriorate. If any injury is severe enough or continued for a long enough period, the ability of the tissue to carry out its normal functions is reduced to a level from which it cannot recover and death follows. From this point on there is no therapy except to find a substitute for the living cell.

A practical application of these principles is to be found in the question of hiring deaf people to work in noisy places. If a person has a conductive deafness, as revealed by comparative air and bone conduction audiograms, he has a built-in ear protector and would be ideal for work in a noisy environment; but if the loss of hearing shows an inner ear involvement, it would be extremely unwise to place this individual in noise. Superimposing overstimulation upon an already partially injured organ of Corti is, as we have seen, very likely to produce further injury.

In this discussion we have presented some of the experimental evidence that relates actual physiological changes within the organ of Corti and excessive noise. These changes will, of course, be reflected in audiometric measures, but changes in neural transmission, unrelated to noise induced hearing loss, also occur. This does not mean that audiometric measures of threshold shifts, recovery rates, etc., are not useful, but they must be interpreted in the light of what is known about the actual physiological changes in the organ of Corti, the seat of injury.

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Company mobile unit provides annual chest x-rays for all employees.

Rehabilitation of Foundry Workers With Active Pulmonary Tuberculosis

A study of 21 employees over a period of 10 years

• L. E. HAMLIN, M.D.
Medical Director
American Brake Shoe Company
Chicago, Illinois

The incidence of active pulmonary tuberculosis among foundry workers varies considerably as it does in different segments of the general population, but the prevalence of the disease in the industry may be influenced to some extent by elements other than contact with open cases of tuberculous infection. The degree of exposure to hazardous occupational dust or fume and the physical capacity of workmen to cope with the exigencies of foundry practice are factors which require proper evaluation when assigning responsibility for this type of illness. Today's modern foundry has come a long way on the road to industrial respectability and the shocking laboring environments of earlier times have, through good hygienic practice and cooperative management, given way to more healthful working conditions. There are plants, however, in which much still remains to be done and until these locations are brought up to standard, their unwholesome surroundings will continue to play a part in the development of tuberculous disease of the lungs.

In 1941, Greenberg[1] summarized results of 11 studies of tuberculosis in the foundry industry made by investigators in the United States, England, Wales, Austria, Germany and Japan. Sixteen foundries were involved and the investigations covered the manufacture of gray iron, steel, malleable iron, nonferrous and combined types of castings. Cases showing pulmonary occupational disease such as silicosis were included along with those having inactive and/or active tuberculosis. In three of the 11 reports the percentage of active tuberculosis found was 0.47%, 0.6%, and 0.9% respectively in groups of 4,035, 314 and 1,614 men examined. Three other plants yielded active disease to the extent of 1.25%, 3.8%, and 6.0% respectively among individual groups of 403, 686, and 201 examinees. Another investigation of a German foundry revealed an incidence of active tuberculosis of 32.0% in a group of 25 workers. No cases of active tuberculosis were found within the remaining nine foundries. A separate New York State Foundry Study in 1938,[2] showed the rate

TABLE I.
PULMONARY TUBERCULOSIS AMONG 4,512 EMPLOYEES IN 32 COMPANY FOUNDRIES DURING YEAR 1954

Type of Disease	Number of Cases	Percent
Active Tuberculosis	7	0.16
Active Tuberculosis and Silicosis	2	0.04
Tuberculosis — Indeterminate Activity	15	0.33
Tuberculosis — Indeterminate Activity plus Silicosis	8	0.18
Tuberculosis — Indeterminate Activity plus Siderosis	6	0.13
Tuberculosis — Indeterminate Activity plus Siderosilicosis	1	0.02
Inactive Tuberculosis	52	1.15
Inactive Tuberculosis and Silicosis	11	0.24
Inactive Tuberculosis and Siderosis	12	0.26
Total	114	2.51

TABLE II.
PULMONARY TUBERCULOSIS (ACTIVE OR INDETERMINATE) IN ALL COMPANY PLANTS FROM 1948 TO 1958 INCLUSIVE

Year	Number of Employees X-Rayed	Number of New Cases Found	Percent
1948	5,749	26	0.45
1949	6,471	14	0.22
1950	6,768	13	0.19
1951	5,335	15	0.28
1952	5,252	9	0.17
1953	7,815	17	0.22
1954	7,890	13	0.16
1955	7,808	12	0.15
1956	8,414	8	0.10
1957	9,348	5	0.05
1958	7,866	6	0.08

for clinically significant tuberculosis to be 0.7%. In 12 of these 16 foundries, therefore, the incidence of active tuberculosis was below 1.0%.

In the present investigation an attempt has been made to obtain a general idea of the amount of active, indeterminate and inactive pulmonary tuberculosis among employees in an organization which has some 47 plants located in 23 different states of the union. Thirty-two of these plants are foundries which produce various types of metal products including gray iron, nonferrous, manganese steel and precision castings. A comprehensive medical program, inaugurated in 1941, provides for preplacement and periodic physical examinations, a well organized nursing service, and an effective industrial hygiene department.

One of the outstanding features of the medical department's activities is the employment of a company owned mobile x-ray unit which visits each plant annually and offers free chest x-ray examinations to employees as a routine service. The unit has now been in operation since June, 1948, a period of 12 years, and has proved to be an effective means of combating pulmonary infection and occupational disease. A popular innovation with employees, its arrival at the plants is eagerly awaited each year.

Because these roentgenographic surveys offered a fairly complete coverage of the workers in the company, it was felt that the findings disclosed would provide a fair estimate of the actual amount of pulmonary tuberculosis existing at the various locations. Consequently, preplacement, reinstatement and recheck chest roentgenograms were not considered because the many variables encountered, such as rejection of applicants for work, early terminations of service, etc., could not be satisfactorily correlated with the general pattern. By far the greater number of these workmen participated in the annual surveys and the majority had long years of service.

Personnel in the plants varies each year, depending on business activity and production, so that for the sake of uniformity it was decided to review the roentgenographic disclosures from the years of 1948 to 1958 inclusive. From this evaluation results for the year 1954 were selected to demonstrate the over-all picture in a practical and representative manner. The year 1954 was chosen because the total number of people x-rayed in that period closely approximated the average annual plant population for the entire interval under consideration. Accordingly, a special study was made of the 4,512 employees in the 32 foundries of the company to determine the incidence of tuberculous disease of the lungs in this particular group. The results are summarized in Table 1.

It will be observed that 39 cases of pulmonary tuberculosis of either active or indeterminate status were found among the 4,512 individuals x-rayed, a percentage of 0.86. These findings are in line generally with the foregoing results published by Greenberg of less than 1% incidence of active tuberculosis in 12 of 16 foundries investigated. They also demonstrate the fact that the amount of disease of this type has remained of a low order of magnitude in these specific plants for approximately the last 20 years. Undoubtedly, many factors have influenced this situation, including better case finding methods, more effective treatment, and the development of newer techniques in medical care, nursing and rehabilitation in the general population. If this were not true, with present day increased production and expanded operations, more instances of the disease might be anticipated.

In order to obtain some idea of the number of "new cases" of tuberculosis disclosed through the annual chest x-ray examination, the following tabulation (Table II) was compiled from roentgenographic surveys made by the mobile unit during the years 1948 to 1958 inclusive. The surveys covered all plants in the company, not just the foundries.

As the summary indicates, the incidence of

new cases of pulmonary tuberculous disease, fresh or of indeterminate activity, discovered each year ranged from 0.05% to 0.45%. It is interesting to observe the gradual decline in the number of cases from 26 in 1948 to six in 1958. One could speculate on the various reasons for this course of events but it appears to follow the general pattern of decrease in the "new case rate" observed by the U. S. Public Health Service and the National Tuberculosis Association in country-wide surveys over the identical period of time. The latest figure published by these organizations in February, 1960,[3] disclosed the fact that the new case rate declined 52.2% from 1948 to 1958.

Of realistic import, however, to health promotion agencies, management and the worker himself, is the attitude or policy of industry toward rehabilitation of workers suffering with pulmonary tuberculosis, particularly those who have also been exposed to significant atmospheric concentrations of dangerous dust or fume. What happens to these individuals after they become ill? Do they ever return to their previous occupations and is there any reason why they cannot come back to the jobs they know best? In other words, can the foundry molder or grinder who has had a bout with tuberculosis carry on from the point where he left off, once his disease has become quiescent?

To find an answer to these and other rehabilitation problems the present investigation was undertaken, although certain limitations such as interrupted years of service, change of job, etc. were recognized as having a bearing on the final outcome. It is believed that the results are of sufficient interest to justify presentation of the findings.

From the aforementioned 4,512 employees of the 32 foundries, 21 workers were chosen for additional further study. All had been given yearly roentgenological chest examinations over the 10 year period and had developed active tuberculosis at some time during the years 1948 to 1958. The various stages of disease met with are listed in Table III.

Among these individuals were one office clerk and one stenographer but the remaining 19 workers, all employed in the foundry itself, comprised five machine operators, four grinders, four molder's helpers, one crane operator, one foundry laborer, one core maker, and three foremen.

The age range of the people in these categories is shown in Table IV.

The most recent report of the Arden House Conference on Tuberculosis, cosponsored by the United States Public Health Service and the National Tuberculosis Association in December, 1959,[4] states that while we are accustomed to thinking of the "reservoirs of infection" as being chiefly among older people, some 36 million Americans are probably infected at this moment, and perhaps two thirds of them are over 45. But half the newly reported active cases of tuberculosis are in people *under* 45. Furthermore, the Public Health Service estimates that there are 2.2 million persons under 25 who are infected, some of whom will break down with active tuberculosis and be the source for new infections in the future. The fact that 19 of the 21 cases in the present study were found in the age range of from 40 to 70 years may have some implications concerning the occupational aspects of pulmonary tuberculous disease in this type of employment, but no specific conclusions can be drawn from such a small series of cases.

A commendable feature of the study shows that 20 of the 21 cases of active disease chosen for review were discovered through the company chest x-ray program while one was found by other means. The preplacement examination was responsible for the disclosure of only two cases, whereas the periodic chest x-ray revealed the remainder. The value of the annual roentgenographic examination of the chest as a case finding technique therefore appears to be amply demonstrated.

One of the most important aspects of tuberculosis in industry is the time lost from employment by the worker. The economic decrement resulting from the impaired health of the individual is reflected in the decreased production experienced by the plant. Frequently in the small foundry the loss of one skilled worker on a key job can seriously affect the output of the entire shop. It is therefore highly desirable to effect rehabilitation of these people as soon as this

TABLE III.
ACTIVE PULMONARY TUBERCULOSIS — 21 CASES

	Number of Cases	Percent
A. Uncomplicated		
1. Early Minimal Tuberculosis	2	9.5
2. Moderately Advanced Tuberculosis	12	57.2
3. Miliary Tuberculosis	1	4.8
B. Complicated		
1. Silicotuberculosis	2	9.5
2. Siderosilicotuberculosis	2	9.5
3. Siderotuberculosis	2	9.5

TABLE IV.
AGE RANGE — 21 CASES — ACTIVE PULMONARY TUBERCULOSIS

Years	Number of Cases	Percent
20-30	1	4.8
30-40	1	4.8
40-50	9	42.9
50-60	7	33.3
60-70	3	14.2

TABLE V.
HOSPITALIZATION AND RETURN TO LIGHT WORK
21 CASES OF ACTIVE PULMONARY TUBERCULOSIS

Months in Hospital	Number of Cases	Percent
1-12	14	66.7
12-24	6	28.5
24-36	1	4.8

can safely be done. The time lost from work by the 21 cases under study, from the date of hospitalization up to the employee's return to "light" work, is summarized in Table V.

The return of 66.7% of these employees to some form of light work in from one to 12 months indicates that with present day methods of case finding and therapy, a majority of employed persons afflicted with pulmonary tuberculosis can anticipate a reasonably early return to their appointed tasks. The importance of early detection of the disease and the institution of prompt, effective treatment is well illustrated.

Six of the 21 individuals in this category were able to come back to work in six months' time or less, and all but seven returned within 12 months. Almost half the group started at their regular full time jobs on resuming employment. Of the remainder, all but five were back at their usual occupations within six months from the time they were assigned light duties.

The present status of these 21 workers is depicted in Table VI. Of practical significance is the fact that 81.0% are actively engaged in productive labor at the present time, and 57.2% are following their regular occupations. All have made excellent recoveries from tuberculosis and have remained well even though most of them perform hard physical work. Surgery, which was employed in six cases, included four lobectomies, one partial lung resection, and one lobectomy with thoracoplasty.

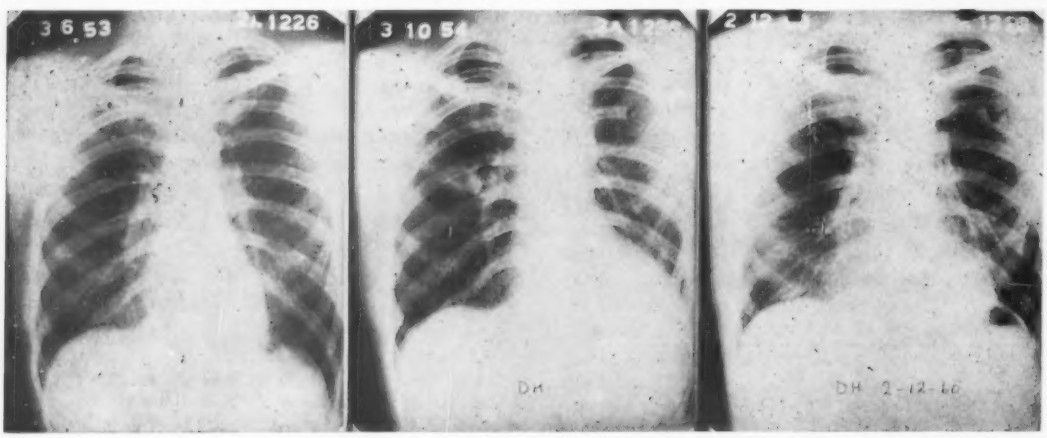
The present condition of the six men with associated pulmonary occupational disease is worthy of special mention. Silicosis or siderosilicosis was coexistent with active tuberculosis in four instances while simple siderosis was demonstrated in the roentgenograms of two other employees. Recovery following therapy was the rule in each case, demonstrating the fact that the effect of foundry dust on lung tissue apparently does not jeopardize adequate response to effective therapy for tuberculosis to the same extent it might have done before the age of antibiotics and lung surgery. The following brief case histories are submitted in support of this conclusion.

TABLE VI.
PRESENT HEALTH STATUS OF 21 FOUNDRY EMPLOYEES REHABILITATED AFTER ACTIVE PULMONARY TUBERCULOSIS

Status	Number of Cases	Percent
1. Well — Actively employed at regular jobs.	12	57.2
2. Well — Actively employed at light jobs.	2	9.5
3. Recovered from tuberculosis but have other complaints — Actively employed at light work.	3	14.2
4. Terminated but well at last contact.	3	14.2
5. Died (motor accident).	1	4.8

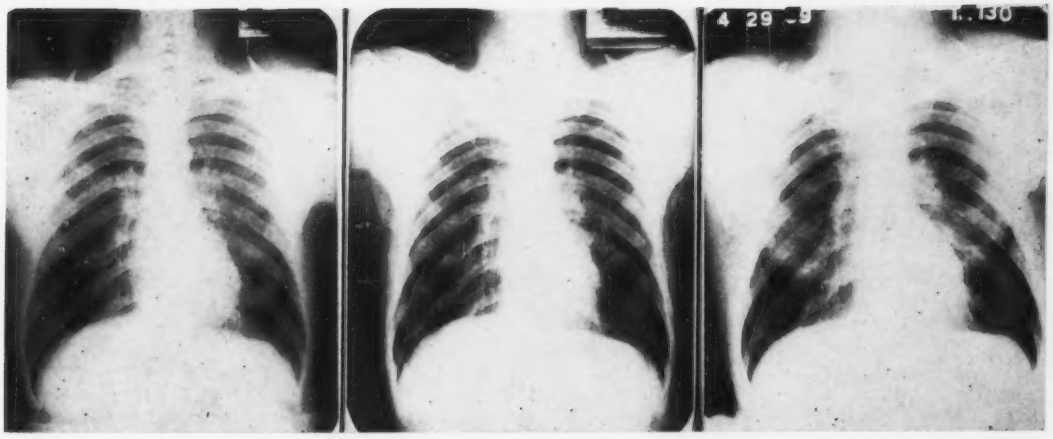
Case Histories

Case 1: D. H., 45 years of age, had been a grinder on manganese steel castings for a



CASE 1, D. H.

Roentgenogram of 3-6-53 shows mild nodular opacities throughout both lung fields, classified as siderosis, with an early minimal tuberculous lesion in the second left interspace. The film of 3-10-54 shows results of surgery with no change in the nodular pattern. The roentgenogram of 2-12-60 shows no further change other than regeneration of resected left sixth rib.



CASE 2, J. C.

Roentgenogram of October, 1947, shows development of early siderosis but no evidence of infection. In the film of August, 1949, mottling indicative of active tuberculosis has developed in the right apical area. The third x-ray in the series, taken on April 29, 1959, 10 years later, shows complete healing of the infection with no further change in the pulmonary nodulation.

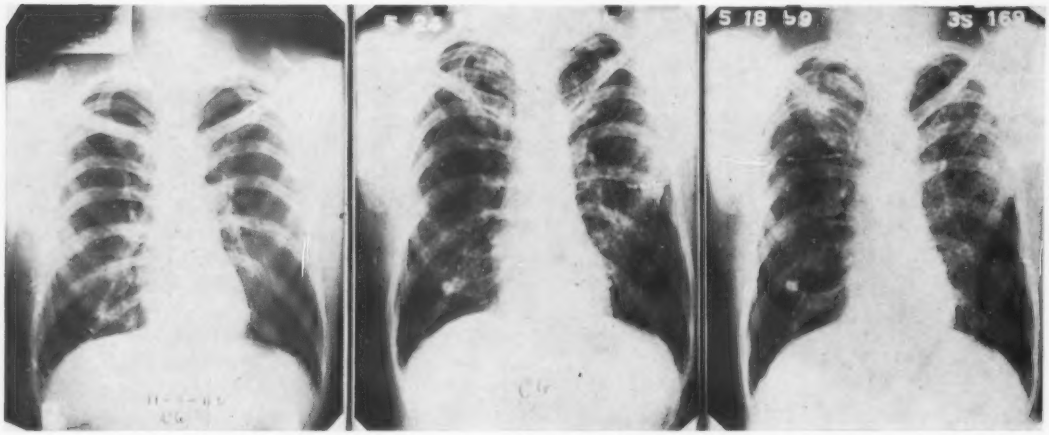
period of eight years. His chest roentgenogram showed a definite discrete nodular pattern, interpreted as siderosis or iron pigmentation of the lungs. In April, 1953, a routine chest x-ray by the company's mobile x-ray unit disclosed an early minimal tuberculous lesion in the second left interspace. Following a period of observation of approximately a year, a left upper lobectomy was performed in which fibrocaseous tuberculosis with focal cavitation was demonstrated in gross and microscopic sections. Bacteriological studies showed many acid-fast bacilli on direct smear and typical colonies of mycobacterium tuberculosis on suitable culture media. The employee made an excellent recovery and returned to work in the pattern shop in September of 1954. He has continued to work under periodic observation without further difficulty.

Case 2: J. C. is a grinder with 35 years experience in a manganese steel foundry cleaning room. His chest roentgenogram disclosed evidence of mild siderosis as far back as 1946. In 1949, he developed a pulmonary tuberculous infection in the apex of the right lung. A cavity was present and the sputum was positive for tubercle bacilli. He had been working on the same job for 24 years when the infection occurred. His disease was recognized through a routine, annual company x-ray survey. He was hospitalized and treated over a period of six months, following which he rested at home for three months, then returned to part time light work at a nondusty operation. After another six months he went back to his regular job of grinding where he has remained without further incident and in good health for the past eight years. He is now 54 years old and is expected to continue his present work until he retires at 65 years of age.

Case 3: C. G. is now 53 years of age. He worked as a molder in a gray iron foundry from 1934 up to the time he developed roentgenographic shadows which suggested tuberculous infection in 1947. After continuous observation over a period of years, he was hospitalized for treatment in February, 1957, with a diagnosis of pulmonary silicosis with superimposed tuberculosis. He made good progress under intensive treatment and was discharged from hospital in August, 1957. He returned to work at his regular job of molder where he has remained up to the present time. He has been under observation by the chest clinic and states that he feels well. He has developed some hypertension recently along with "neuritis" of the right hand and arm but his tuberculosis remains arrested.

Case 4: E. D., a 48 year old employee, was a crane operator in the foundry for 20 years. He was classified as having mild silicosis in 1951, but his earlier chest roentgenograms in 1942 suggested some minimal tuberculous infection of indeterminate activity. He was observed until September, 1954, when he was found to have active pulmonary tuberculosis. A lobectomy and thoracoplasty were performed and the pathological report indicated the presence of a tuberculous cavity. The employee made a satisfactory recovery and returned to his regular occupation after a period of 14 months. He has continued to work at this job for the past three years without difficulty, but remains under observation although he is apparently well.

Case 5: P. B., who is 49 years old, had been

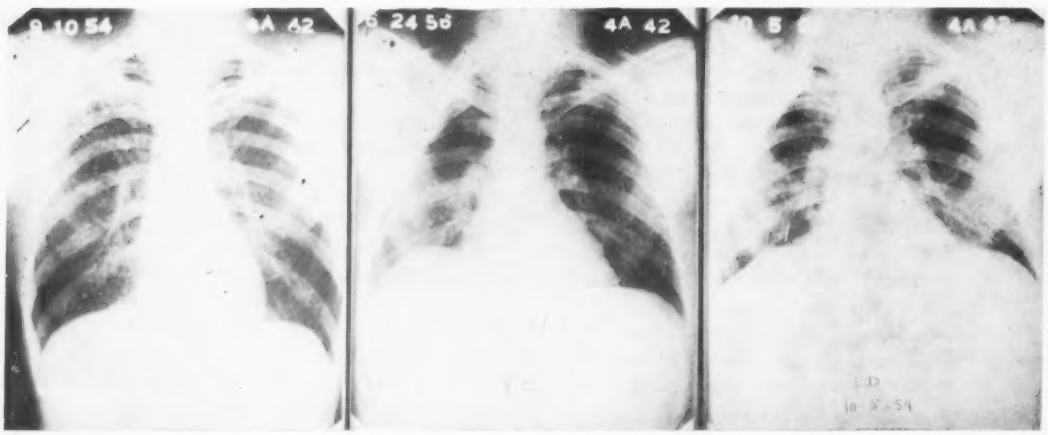


CASE 3, C. G.

The film of 11-5-40 shows evidence of early silicosis without tuberculosis. The x-ray of 5-24-54 reveals increased evidence of silicosis with superimposed tuberculous infection in the right upper lobe and to some extent in the left. The latest film of 5-18-59 indicates stabilization of the lesions with little if any progression of the silicotic process.

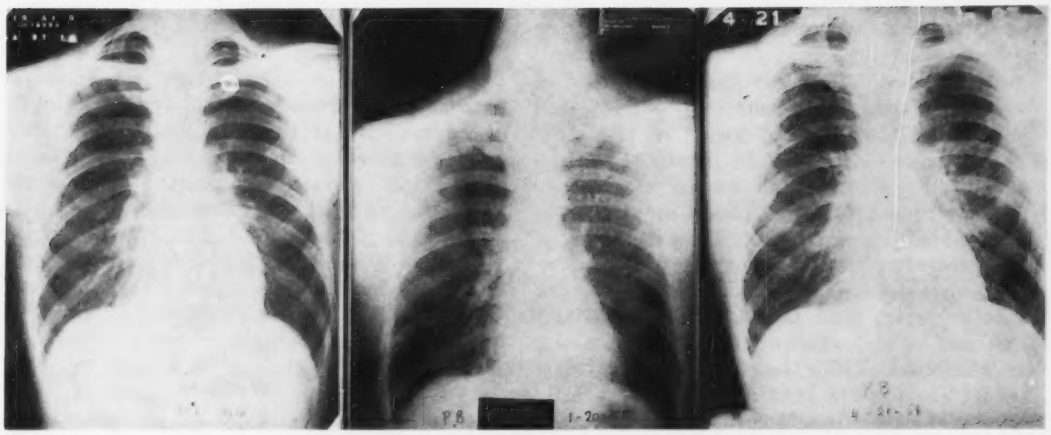
a grinder in a manganese steel foundry for 13 years when a company chest roentgenogram in 1955 disclosed the presence of a tuberculous infection in the upper right lung. In addition, it was noted that previous serial films showed siderosis dating back to 1950. The employee was hospitalized in February, 1955, and treated intensively for his disease which was associated with findings positive for tubercle bacilli. He made excellent progress and was discharged from hospital in July, 1955. He came back to work in the pattern loft the following month where he stayed for several months. However, all the while he was very anxious to get back to his job of grinding. He was finally allowed to return to the cleaning room as a lead man instructing new employees in September, 1956. Later, in March, 1957, he returned to work as a grinder with the stipulation that he must wear a respirator continuously. He was quite cooperative in this regard and continued on the job until he was laid off temporarily due to a plant reduction in the working force. Following this he failed to report again for work and his employment was terminated. He was apparently well at this time.

Case 6: H. M., a manganese steel foundry foreman, died from injuries received in an automobile accident in October, 1954. He was 62 years of age and had worked in the cleaning room since 1916. He was known to have had some exposure to free crystalline silica and iron



CASE 4, E. D.

Roentgenogram of 9-10-54 shows mild silicosis with tuberculous lesion containing a cavity in the upper right lobe of the lung. Films of 9-24-56 and 10-5-59 reveal results of lobectomy and thoracoplasty with subsequent healing of the infection. Some increase in fibrosis is suggested in the x-ray of 10-5-59.



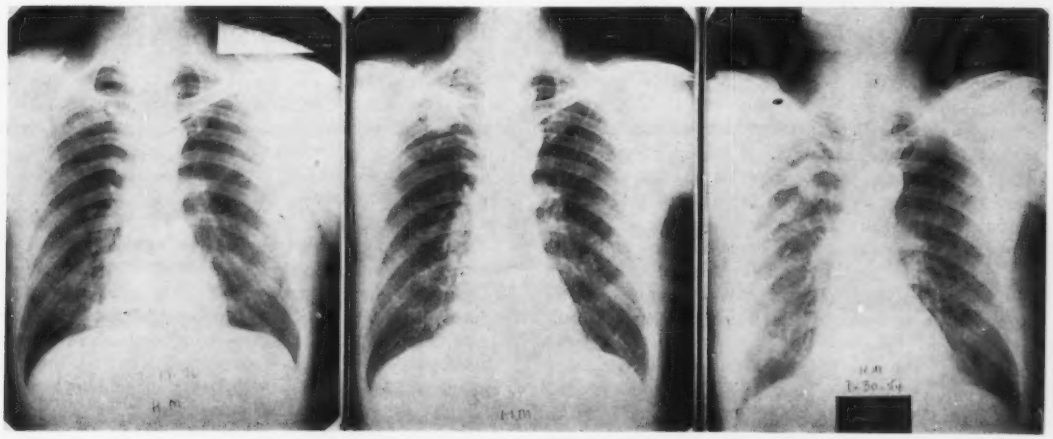
CASE 5, P. B.

The roentgenogram of 11-16-44 was considered to be within normal limits in contrast to the film of 1-20-55 which discloses siderosis with superimposed infection in the upper lobe of the right lung. The latest film taken on 4-21-58 shows healing of the lesion with no definite change in the nodular pattern.

oxide over these 38 years but underwent surgery for an infiltration in the upper lobe of the right lung which had been under observation since 1936. The lesion had been gradually increasing in size and on pathological examination proved to be a focal area of siderosilicotuberculosis. Recovery was uneventful and the employee was in good health at the time of his accidental demise.

Comment

The experience with pulmonary tuberculosis portrayed in this study is not unique and no doubt can be duplicated in many other industries in this country and abroad. Nevertheless, it illustrates the fact that with the maintenance of proper operating environments, occupational disease of the lungs need not be an exceptional problem. The importance of adequate control of hazardous dust and fume produced by many foundry methods cannot be minimized nor can the knowledge that more specific forms of treatment for tuberculosis are now available, be substituted for proper exhaust ventilation and other hygienic measures designed to ensure safe atmospheres in which to work. If management lives up to its obligation to provide such surroundings and if employees will cooperate in using the protective equipment installed for their benefit, workers can, in the great majority of instances, be returned to their regular jobs at the same rate of pay that prevailed before they became ill. To make the idea work, however, there must be



CASE 6, H. M.

Serial roentgenograms demonstrate the presence of siderosis in 1936 with subsequent development of a focal lesion of siderosilicotuberculosis in the upper right lobe. The film of 7-30-54 shows end result of surgery with no further change in the nodular pattern.

an increasing, firsthand knowledge of working conditions in the plants by family physicians, internists and hospital medical staffs so that accurate diagnoses of pulmonary ailments can be made. Without some definite idea of the degree of exposure produced by industrial harmful agents, the physician cannot be expected to evaluate properly the part played by an affected worker's employment in his present disability. It is therefore incumbent on the doctor to become more familiar with occupational practices, a policy which most manufacturers will gladly welcome. Labor organizations must also attain an awareness of the fact that these employees cannot be rehabilitated unless assurance is forthcoming that unfair and costly claims for compensation will not be instigated. Rehabilitation of the tuberculous worker embodies the best effort of all concerned — physician, management, union, and the individual himself. With cooperation such as demonstrated in the reports described herein, complete restoration becomes an accomplished reality in the majority of cases.

Summary

A study of pulmonary tuberculosis among a small group of foundry employees indicates that the majority of those afflicted with active or indeterminate manifestations of the disease can be safely returned to productive labor at their regular jobs following adequate treatment. The incidence of tuberculosis in the foundry industry is small so that with proper hygienic control of working environments, together with cooperation between management, physician and worker, rehabilitation can be satisfactorily achieved.

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Medical Department Costs

Company medical departments pay off. Industrial physicians and personnel administrators say a properly organized and administered medical department can slash absenteeism, cut job turnover, and reduce time lost as a result of injuries.

Where previously supervisors might send home employees who complained of headaches or stomach aches, the medical department may give them medication and send them back to the job. One company reports that 97% of medical department patients return to their posts. A large New York advertising agency reports absenteeism was cut 40% by establishing a medical department. Estimated annual savings: $35,000. A. D. R. Fraser, President of Rome Cable Corp., Rome, New York, says absenteeism in the company dropped from 3.5% to 1.6% in the first year following installation of a medical department. Annual savings came to more than $800 per production worker. An insurance office with 200 employees cut labor turnover from 6.4% to 3.4% within two years after inauguration of medical facilities.

Just the existence of a medical department helps reduce job turnover. That is the opinion of the American Association of Industrial Nurses. The Association says a medical department shows the company is interested in employee welfare; thus building loyalty to the company.

Medical departments can help cut lost-time injuries, also. This conclusion is drawn from a survey by the Newspaper Personnel Relations Association. The study, by Leonard Peet, Personnel Director, *Atlanta Journal & Constitution*, indicates 80% of newspaper medical department directors feel their clinics have been helpful in reducing accident severity rates, and 70% feel time lost due to on-the-job injuries has decreased since installation of their department.

A spot survey of 22 corporations indicated that the size of work force and the number of visits per worker does not appear to affect minimum medical department costs. Office space, medical equipment, a full-time industrial nurse, and a physician on call are standard. Basic annual cost: $22,500 to $36,000.

Some companies employ professional assistance in setting up and manning their medical departments. Life Extension Examiners of New York who perform medical checkups for companies, organize medical departments for client-companies at an average cost of $9 per employee. Minimum investment is $9,000 per year. Services include a completely equipped medical department, a full-time industrial nurse and a doctor on call.

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Simplified Psychiatric Nomenclature

For the Industrial Physician and General Practitioner

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By classifying the mentally ill patient according to the way he thinks, and therefore the way he acts, the physician can arrive at an accurate yet understandable diagnosis.

The use by nonpsychiatric physicians of a simplified system like the one presented here might serve as a strong influence toward the adoption of a better "official" system.

Unfortunately, psychiatrists in the past have not excelled in making their knowledge understandable to other physicians. One might easily get the impression that we psychiatrists have gone out of our way to make ourselves ununderstandable. Although we psychiatrists often complain about the prejudices and hostility which seem to emanate from our medical colleagues, we seldom take into account the fact that much of the misunderstanding which exists is due to our own failure to express ourselves in a language with which others are familiar. The matter of psychiatric diagnoses is a case in point. We psychiatrists have collected an imposing list of psychiatric terms which we call diagnoses and which could discourage anyone who wished to get an elementary understanding of our field. Actually, the majority of the terms we use as "diagnoses" reflect our own individual preferences for names, and not the specific clinical condition of the patient. The condition, "psychoneurosis," for example, masquerades under a couple dozen different names, any one of which could apply with equal accuracy to any particular patient. In viewing one facet of a person's life we may be impressed primarily by the presence of fear, in which case we would arrive at the diagnosis of "psychoneurosis, anxiety reaction." The next day, we might see a different side of the same patient and call him a case of "psychoneurosis, obsessive compulsive reaction." If we should happen to take a great dislike to this patient, we might decide he is a "psychopathic personality, inadequate type."

Many of the terms we use diagnostically are simply euphemisms employed to present a pleasanter picture of something that we expect, otherwise, would carry a stigma. The good Anglo-Saxon word "crazy," for example, is a

suitable term to use for certain conditions we find in patients. A hundred years ago when psychiatrists first began to specialize in the care of patients of this sort, we devised the term "insane" to diagnose these people, thus demonstrating that we knew more about the state than the public did! It was not long, however, before the public adopted this term, too, forcing us to resort to a new euphemism. This time we cleverly resorted to Latin, and invented the term "dementia praecox." No sooner did we succeed in getting this one firmly established than one of our confreres, Bleuler, created the term "schizophrenia." Now we use this latter term, but we are secretly looking for a new one to replace it because too many people have come to know what it means. Actually, it means "crazy," nothing more and nothing less.

Simplified Psychiatric Diagnoses

If one never had to fill out the blanks on a hospital chart or an insurance form, it would be easy to get by without ever using any kind of psychiatric diagnoses. However, our democratic society is bound together by sizable amounts of red tape, and this fact often creates situations where we have to write something down on a piece of paper to convey some kind of psychiatric impression of a person. For this reason only, we might take the trouble to learn a simplified system of psychiatric nomenclature. We would hope that simplification would not be achieved at the expense of accuracy. Following is a system that is both simple to learn and use, and also quite accurate. For those who wish, each of these few terms could be embellished with certain adjectives such as "mild," "moderate," or "severe," to make the meaning more precise. If one wished to go even further in the direction of refinement, it is quite legitimate simply to state after the main diagnosis the prase "manifested by . . . . .," including one or more descriptive phrases illustrating the outstanding features. Conditions in which there is a basic neurological type of pathology are not included, for these are neurological rather than psychiatric problems (such as encephalitis, epilepsy, brain tumor, brain injury, etc.)

Recommended Nomenclature

Before deciding what diagnosis to select for a particular patient, we need to define precisely what we are diagnosing. In spite of what we might hear from time to time of a contrary nature, a psychiatric diagnosis is simply a category into which we classify a particular way of thinking which we find in a patient. We are attracted to a study of his way of thinking by noticing his way of behaving. We need not have much sophistication about these matters to realize that his way of behaving is a reflection of his way of thinking. and when he changes his way of thinking, we see a change in his behavior. Our diagnoses will, therefore, be the possible categories into which we can classify different ways of thinking. They are as follows:

Normal: More so even than in general medicine, we need to use our *Normal* baseline from which to assess aberrant ways of thinking. Presumably, the physician who is making the examination will be able to use his own way of thinking as his *Normal* yardstick. Simply and specifically, we can say that normal thinking is the kind which "arrives at rational, practical decisions through the employment of a coherent system of logic." We might simplify this even further by calling it "common sense." Correspondingly, common sense will be the feature which we find partially or completely absent in the psychiatric patient.

Neurosis (or Psychoneurosis): As we implied above, neurosis will be characterized by some degree of impairment of common sense. The true neurotic is not completely lacking in common sense. He may use it quite frequently, may easily recognize it in others, and may even admire it in others. Yet, he does not always use common sense, and he is particularly apt to abandon it when things get rough for him, when he wants something very much, and when he thinks he can get away without using it. In this respect he is like an adolescent who seems quite sensible most of the time, but sometimes resorts to an immature, childish, unsensible way of accomplishing something, particularly in the face of stress. The typical neurotic will express his somewhat childish way of thinking through his tendency to carry rather commonplace human frailties to an extreme. For example, he will complain about his health too much; he will be either overly neat or overly untidy; he will tend to be either miserly at one extreme or extravagant at the other. He will, especially, be either overly pessimistic or overly optimistic about the outcome of his decisions; in other words, he will either be a great worrier or brash. In respect to common sense, we can say about the neurotic that he usually knows what it is, but he does not consistently employ it because he does not have much respect for it, meaning that he is not willing to pay the price for being, consistently, a common sense person. This usually boils down to work for future rewards.

Because his way of thinking is an exaggeration of what we might find in a normal person, rather than being something strikingly different, we are not likely to recognize the neurotic at first glance. It takes a little investigation into

his ways of living and thinking before we realize that he often fails to make consistent use of a calm and practical way of thinking, even though seeming to use it under some conditions. In other words, a short-range, cross-section view of the neurotic does not usually reveal his basic neurotic way of thinking. Only by obtaining a longitudinal view of his past history or by following him for a while through the present and future are we able to see the ways in which he tends to carry too far, or make too often the human errors which anyone might make, but which the normal person learns to correct. Because his system of living and behaving has these immature qualities, it is likely to break down and cause undue disappointment, fear, anger, frustration, etc. When this happens, he shows himself to the physician as a "neurotic" with "symptoms." As long as his system does not break down, he does not present "symptoms." It is meaningless to ascribe any unique character to the "symptoms" for they can take a variety of forms which are limited only by the patient's imagination. The physician is less likely to make mistakes about the neurotic if he regards the complaints presented as nothing more than indications that the neurotic system has failed to work.

Psychosis (or Schizophrenia): Under this category we are putting only those patients who are psychotic ("crazy") but have an intact central nervous system. In state hospitals these are called "schizophrenics," "manic-depressives," "involutional melancholics," and even "senile psychotics." In spite of the different labels, these patients differ only according to their ages, which means that they have had systems of thinking and living which have broken down at different times of life. Again, we can examine these people from the point of view of how they handle "common sense." We find that not only do they lack a deep respect for "common sense," but they go further, actually showing contempt for it, a quality which prevents them from really knowing what it is. This makes them quite different from the neurotic, and this also imposes considerable difficulty on our ability to help them. The process by which their thinking arrives at conclusions bears little or no resemblance to what we commonly know as logic, but is likely to start from unfounded premises to arrive at preconceived conclusions without relying on any substantial amount of data to support them. The schizophrenic does not hesitate, for example, to draw sweeping conclusions about all people on the basis of a single unpleasant experience. If he wants to believe something, he fabricates out of his imagination, or selects from unrelated sources, material to support his conclusions. Interestingly enough, however, even the schizophrenic will have reasons for believing what he believes or for doing what he does. These reasons may not appear logical or sensible to anyone else, but they appear sufficient to the schizophrenic. In other words, the schizophrenic at least tries to justify his conclusions, but the quality which appears to be so bizarre to others is the irrational type of justification he uses.

No isolated piece of behavior can be judged as being psychotic in its own right, but can be judged so only on the grounds of its having come about as the result of an irrational course of thinking. A person cannot be judged psychotic unless it can be demonstrated that irrational thinking characterizes a great deal of that person's usual way of thinking, but not necessarily all of it. A psychotic person may appear quite rational in his thinking when he is dealing with impersonal material. His irrationality is most apparent, or may be solely apparent, when it concerns his concept of himself and of other people in relation to himself. The so-called "intelligence" of a person gives no clue as to whether he is psychotic. He may be brilliant, for example, but be lacking completely in common sense thinking. We must also be careful that we do not fall into the trap of regarding as "normal" the person who happens to agree with some of our opinions, and to regard as "psychotic" the one who disagrees. The particular stand that an individual takes on an issue is no measure of his degree of irrationality, but, rather, the kind of logic he uses to arrive at his conclusions will be the determining factor.

Delirium: This condition, one which is produced by a toxic state of the brain, is best regarded as a medical rather than a psychiatric problem, but is mentioned here because it often becomes a source of misunderstanding. In the same way that fever or tachycardia are manifestations of a toxic state, delirium is a manifestation when a toxic process involves the brain. The basic thinking problem in delirium is a disorder of the perceptual apparatus. This means that the incoming nerves or spinal cord tracts which bring sensory signals to the cerebrum have been affected in such a way that false messages are received. Because the brain receives false impressions of the outside world (that is, outside the brain) a very logical process of thinking may lead to incorrect conclusions. Perhaps the simplest example of this would be that of paresthesias where peripheral nerves send tactile messages to the brain not from sensory impressions picked up by tactile end organs, but from injured or diseased neurons. Because these pathological signals or perceptions are not clearly related to reality and to ex-

perience, they are likely to introduce a high degree of uncertainty and confusion which frighten the patient, so that he is apt to be anxious during his period of delirium. When the toxic agent (such as in delirium tremens) is exerting a toxic effect on the entire nervous system, so that all nerve cells are impaired in their function, the degree of confusion becomes so great that the sensory apparatus is completely out of touch with the outside world. In mild degrees of delirium it is usually possible to "reach" the patient, or to hold his attention, through some sensory pathway (vision, auditory) which is relatively unaffected. When this can be done, the patient can be taught to disregard the false sensations he is experiencing and thus make it possible for him to think rationally. When all sensory pathways are affected to a serious degree, then the physician cannot get the patient's attention, and rationality becomes difficult to achieve. In contrast, patients in the category we described before under "Psychosis" show no defect in the sensory apparatus. The false conclusions arrived at are not produced by false messages coming to the brain, but by false interpretations of reality resulting from an incorrect form of logic.

Other Syndromes: Conditions that are highlighted by such features as alcoholism, drug addiction, homosexuality, etc. do not require specific diagnostic categories for they are not significant as etiological factors. Instead, in each one of these conditions we will find that the patient is either a neurotic or a psychotic (never normal) and the outstanding trait which attracts our attention (such as excessive drinking of alcohol) is simply one of the many irrational or impractical types of activity to which his brand of thinking leads him. More important than the specific manifestations is the underlying type of thinking, so that a simple and accurate diagnosis could be, for example "Neurosis, severe, manifested by alcoholism." All alcoholics are not neurotics, however, for many of them are psychotics. Similarly, an external manifestation such as compulsive hand washing may be found in either the neurotic or the psychotic.

Summary

We have suggested a simplified system of psychiatric nomenclature and have discussed the nature of the "pathology" upon which it is founded. Excluding medical or neurological conditions (and delirium) which might have secondary cerebral manifestations, the primary psychiatric conditions can be summarized as follows:

1. *Normal:* A person whose way of acting, and therefore way of thinking is consistently, (but, of course, not invariably) rational and practical.

2. *Neurotic (or Psychoneurotic):* A person whose way of acting and thinking is frequently immature or impractical, especially in times of stress, although the capability of rational thinking is present. Basically, there exists in this person a lack of respect for common sense.

3. *Psychotic (or Schizophrenic):* A person whose way of acting and thinking is profoundly irrational in respect to his view of himself and others (although it may seem fairly rational in relation to impersonal data).

Subcategories: In addition to the principal diagnosis, a particular person may be additionally classified according to whether his neurotic or psychotic way of living differs from the normal to a mild, moderate or severe degree. In any one patient, of course, the degree may vary from time to time. Furthermore, a diagnosis may be refined to a more precise extent by the addition of descriptive phrases following "manifested by . . . . ." Examples of the kind of descriptions which might apply to individual cases would be: anxiety, paranoid tendencies, compulsions, alcoholism, drug addiction, homosexuality, depression, hostility, etc.

The above system of nomenclature is suggested as one that would be useful for nonpsychiatric physicians to use. It has no official standing. The present "official" nomenclature is unsatisfactory from all points of view, since it consists merely of modifications of old descriptive ("symptomatic") terms unrelated to the nature of the neurotic and psychotic thinking processes. The "official" nomenclature will be changed again, as it has been many times in the past, because it is so unsatisfactory. If nonpsychiatric physicians adopt a simplified system like the one proposed here, this might serve as a strong influence toward the adoption of a better "official" system. The present "official" nomenclature is the one adopted by the American Psychiatric Association, and is also used in modified form by the military services and the Veterans Administration.

The Early Recognition of Behavioral Disturbances

Drawing on experience from psychiatric practices in the armed services, the author discusses methods of detection and prevention of mental problems of industrial workers.

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It is obvious that the goal of industrial medicine is to have a healthy worker on the job. This means not only the most efficient function of the working force but also, when possible, the awareness of and assistance with worker problems outside the actual work period. It would appear that from time to time the benefits which might be derived from the disciplines of psychology and psychiatry have been oversold with consequent rejection of these disciplines when the expected results have not been produced. On the other hand, it would appear that there is still an insufficient awareness of potential benefit in certain areas. For example, the training of supervisors and first-aid personnel in the recognition of latent or developing mental health problems has not been universally present and full use has not been made of this potential.

The experience derived from psychiatric practices in military service could well be examined for possible use in industry, and I shall lean heavily on the experience of the military services. With this in mind one might divide the subject into four categories, as follows:

1. Screening;
2. Early detection;
3. Preventive measures, which should apply both to the prevention of the milder disturbances and of the development of a milder disorder into a serious and perhaps unsolvable problem.
4. The decision as to the handling of the problem once it has actually got out of hand.

Screening

Let us consider, then, each of these categories in turn. Before World War II it was generally considered by psychiatrists that it should be possible to do a brief screening of individuals and to determine to a large extent those who would function satisfactorily in military service and those who would develop serious difficulties. In a meeting in January, 1941, in Washington, Dr. Harry Stack Sullivan, who was then Advisor to Selective Service, suggested that this could be done by training general practitioners associated with the local Selective Service Boards to be aware of certain problems in the selectee which would indicate his lack of capacity to function in military service. This plan was developed because it was obvious that there were by no means enough psychiatrists available to undertake such a large assignment as would be required for mass induction. It very promptly became obvious that this was a vain hope and that a brief history and examination would result in about as many errors as correct decisions. It then appeared that by obtaining a fairly complete longitudinal life history of the selectee—his adjustment at home, in school, and perhaps in work—there would be indication of his future military adjustment. An attempt was made to set this up in 1943 through the medical survey program. This plan also fell by the wayside by virtue of the inadequacy of the reports received

at the induction stations and by the fact that breakdowns very commonly occurred as a result of variations in environment threats, by the serviceman's motivation or lack of it, and by the marked variations in leadership within military forces.

It would seem that in industrial circles a more careful evaluation could be made than was possible in the military service. Certainly a work history covering a considerable period would be a valid reason for the assumption that the individual would be able to continue to make a satisfactory work adjustment. The question of environmental factors and leadership provided by the worker's immediate supervision would seem to represent a significant problem in present-day industrial circles. There is certainly a need to recognize various sources of satisfaction and dissatisfaction in the daily environment of the employee. Perhaps with the conflict which exists between management and labor and sometimes the use of propaganda to develop what are oftentimes false points of view on the part of the working man, there is a tendency to reduce the motivation and make adequate leadership difficult, if not impossible. Thus a considerable amount of investment in the study of environmental factors might be particularly important to reduce the ineffectiveness of the worker. In military service, the quality of leadership could be judged by the degree to which the needs of the members of the group were fulfilled and at the same time aligned with group purposes. This lesson should apply directly to industry.

Another sheet could perhaps be taken from the military book with regard to training and assignments as a part of the screening procedure. Later in World War II and in the Korean War it became apparent that a trial period in a given assignment was a better way of screening than any kind of background information. If in industry it were possible to assign the worker to a job on a tentative basis, either with or without the aid of psychological studies, and a determination made of the actual interest and productivity of the worker, then this could lead to a greater degree of satisfaction on the part of the individual involved and to more effective work loads. It would seem entirely appropriate to negotiate such an arrangement in the union contract. The union and company representatives might accept such a suggestion if it is clearly understood that such an arrangement would be to the advantage of both the worker and the company.

In some companies where workers have been assigned on the basis of psychological study alone, I have seen serious errors made, particularly in the minor executive group. This is one of the areas referred to in the assumption that psychology had been oversold. In making this suggestion, I would not want to be understood as recommending against a procedure which had proved itself to be useful and expedient.

Early Detection

The second factor is that of the early detection of disturbances which might lead to difficulty, and this is actually the reason for this presentation. It is a generally accepted fact now that the seeds are sown in early childhood or in adolescence for the development of emotional and behavioral disturbances. Although such early manifestations as difficulties in the relationship with parents or problems in school may not receive much attention, as we review the early life history of an individual evidences of difficulty usually can be determined to have occurred at a very early period. The degree of resistance which an individual manifests in response to stress, of course, depends greatly on his personality structure, and any factor which may strengthen the resistance to stress will be an important point to be considered later. The threshold level of stress resistance is a varying combination of the protoplasmic structure, early environmental molding and intrapersonal factors. Thus, fatigue may lower the threshold, but fatigue can be and perhaps more often is the result of using too much energy in emotional conflict.

In childhood the pattern of excessive rebellion against authoritarian figures such as parents or teachers is often the first sign of what may be a serious problem in later life. To some extent this exists with all of us. We may resent being stopped by a policeman and tend to show this resentment even though we know that we are in error. There are numerous symptoms which should be looked for, but it would seem wise first to consider what is meant by the vague and ambiguous term "mental health" before we attempt to evaluate the procedures which might be used for the detection of mental ill health.

> "No field of medicine battles against such a welter of superstition and misconceptions regarding its doctors, patients and methods of treatment as does psychiatry. Unfortunately, the greatest lack of understanding, the most frequent source of misunderstanding is the attitude of the medical profession itself."

This is a statement once made by Dr. Alan Gregg. Certainly this applies to the concept of mental health and disease in a more positive fashion than in anything else. We must turn to the behavioral sciences to provide us with the basic knowledge about human functioning. Un-

fortunately, our knowledge about deviations and malfunctionings far exceeds our knowledge of healthy functioning. It is certainly unwise to accept a statistical definition of behavior or of mental normality.

> "If once the statistically normal mind is accepted as being synonymous with the psychologically healthy mind (that is, the mind in which the full capacities are available for use), a standard is set up which has a most fallacious appearance of objectivity."

One of the better definitions of mental health is that of Karl Menninger, who said:

> "Mental health is the adjustment of human beings to the world and to each other with a maximum of effectiveness and happiness, not just efficiency or just contentment or the grace of obeying the rules of the game cheerfully. It is all of these together. It is the ability to maintain an even temper, an alert intelligence, socially considered behavior, and a happy disposition."

That the unhappy were sick is described in the Bible when the friends of Job told him that the reasons for his utter misery must be sought in himself.

I would not like to leave the impression that one must conform to Menninger's description of mental health if one is to do a reasonably good job. As a matter of fact, there are many individual personality complexes that, though in some way abnormal by traditional standards, would make a better adaptation to particular kinds of jobs than a clinically healthier person could hope to make. Thus, in military service many individuals who were severely neurotic had outstanding military records. Certain kinds of neurosis actually lead to the discharging of a specific kind of responsibility in a better-than-average fashion. Take the obsessive or compulsive person whose neurosis is of moderate degree. Such an individual is required by his neurosis to do the best possible kind of work with particular attention to the smallest detail. Furthermore, the individual who appears to be shy and retiring, even the mild schizoid individual, can often do by far the best kind of job in research or in areas where mixing with a large group is not required. On the other hand, the individual who in general might be considered as normal, placed in a position of isolation, or the intellectual person on an assembly line, might find this to be a kind of stress with which he would be unable to cope.

We are concerned here with the fact that most of the manifestations which should be used for the referral of workers for psychiatric study are based on social incompetence rather than on lack of technical competence, although a decrease in technical competency may very well be a manifestation of emotional disturbance. Thus the referrals for insubordination, general unreliability, absenteeism, trouble making, drinking, laziness, violation of rules, carelessness, irritability and fighting, dishonesty, misconduct, loafing, dissatisfaction, may very well represent the workers with psychological problems. Such factors as bad attitudes, morale disturbances, poor productivity, chronic complaining, indifference, resentment of authority, daydreaming, time-wasting, are also factors which may be of significance and should be given consideration. These are not necessarily manifestations of a conscious reaction.

When a worker stays by himself, or appears to be too shy and sensitive to mix with others, or becomes the butt of jokes of the group, he may be manifesting a few among many indications that trouble is brewing. Sometimes the very fact that he is the butt of jokes of the group is an evidence of the group's recognition that he is abnormal or bizarre. Oftentimes this indication is not recognized.

It is not generally recognized that somatic symptoms may be actually a camouflage for a serious underlying depression, and that in turn depression may be a manifestation of resentment, hostility and aggression. Many of the symptoms described above may be directly related to such factors. These manifestations, however, may oftentimes be quite as much the result of unsatisfactory placement or poor leadership as they may be the evidence of early sign of behavioral disorder. Thus the use of special screening aids such as the Cornell Index (during the war it was called the Cornell Selectee Index), may be of particular value.

Since industry naturally seeks maximum effectiveness from the manpower in its employment, it might be well to establish a consistent, acceptable and standardized procedure for the handling of psychiatric problems, including the manifestations indicated above. Under such circumstances, if an individual is referred for study he is not likely to interpret this as a kind of stigma. On the other hand, if psychiatric referral appears to be an unusual procedure, the workman involved may very well feel singled out and accused and interpret this as a humiliating experience.

It is increasingly recognized that it is important for managers and supervisors to know well their employees and subordinates. Only by so knowing them can they recognize early behavioral and emotional changes. This represents the equivalent of the emphasis given in military service that company commanders must know their men. Supervisory personnel should be

taught the early signs and symptoms of emotional disorders so that they will be in a position to refer employees for emotional first-aid when that is needed. An example of what can be accomplished in this connection is the experience of our psychiatric clinic at Jackson Prison. A series of lectures and discussions with the guards has led to an entirely different attitude on the part of the guards toward their prisoners, and I am told by Warden Bannan that this has been an extraordinary contribution to the strengthening of morale and the reduction of agitation and disturbance in the prison.

Preventive Measures

In considering the question of prevention, it must be realized that a very large percentage, some authors say as much as 90%, of the on-the-job problems of employees are related to their personal off-the-job lives rather than to the on-the-job situation. When supervisory personnel know their employees it is oftentimes possible thus to learn of developing difficulties. Industrial psychiatrists emphasize the importance of having emergency psychiatric treatment facilities available on the job or in the factory. Thus early and prompt treatment would appear to be as important as in military service where military psychiatrists emphasize the value of treatment as near front lines as possible, and the avoidance of the separation of the soldier from his unit. To meet this need some industrial organizations have provided counselors who may be consulted by employees about off-the-job problems which, until solved, seriously interfere with the employee's efficiency on the job. Actually, if the employee has a basic emotional problem, the farther away from the job he gets the more difficult it is to resolve the problem and return him to work. Here it should be emphasized that suggesting a period of "time off" may be the worst kind of recommendation for ambulatory neurotics. Unfortunately, the value of this factor is not generally accepted and I have had many patients who have come to me after a series of difficulties on the job where I am sure that the serious difficulty which I was asked to treat was to a very large extent iatrogenically determined. The need for these psychiatric first-aid stations is being resisted in some industries in the same way that the setting up of physical first-aid stations was resisted after World War I.

The influence of the attitude, behavior, and policies of top management and supervision in the way employees function is receiving increasing attention. Much of the effect of the supervisory leadership in military service was identified as a factor influencing mental health and effectiveness in their commands. Further, it is necessary to convince management that many emotionally handicapped persons can be utilized effectively as well as the physically handicapped. The benefits of retaining such skilled personnel and reducing employee turnover are obvious. In one situation, a psychiatrist asked the president of a company what he thought the cost of the employee turnover per year would amount to. The answer was $100,000. Investigation, however, indicated that the cost of employee turnover in that organization amounted to over two million dollars per year. Resistance to the implementation of principles of prevention stems not only from management but from the fears of organized labor and of the individual that certain of their prerogatives may be usurped. The need for a satisfactory balance between stresses and emotional supports applies equally to non-military as to the military situation. Liberson states that industrial trouble spots are the foreman, the work environment, fatigue and group maladjustment, to which I should like to add and re-emphasize the home environment.

Psychiatric Treatment

The final question—that of decision concerning the proper handling or planning for an individual whose condition is such that his employment cannot be continued—can be discussed very briefly, although it is a matter of considerable importance. After an employee with evidence of a mental disturbance has been identified, it is obvious that some attempts should be made to give him psychiatric first-aid. If this does not suffice to reduce or remove the symptoms, then he should be referred for treatment outside the organization. I doubt very much whether adequate intensive psychiatric treatment can be carried on in an organizational setup, although supportive therapy and counseling by the company psychiatrists or physicians are certainly indicated.

Certain more serious problems may develop in which it becomes vital that the individual be separated from the company, not only for the welfare of the worker but for the company as well. Oftentimes the significance of this in terms of the benefit to the employee may be difficult to sell, either to the employee or to organized labor. An example of what I have in mind is a patient I saw recently, referred by an industrial organization. This man had been injured three years before and for three years has been the source of difficulty as far as the organization was concerned. In a very brief evaluation of the patient's background, it appeared that he had been married for some nine years, that two months before his marriage he had become converted to religion and had "given up all his sinful ways of

adultery, stealing, fighting and other illegal behavior of this sort." His behavior on the job for some six years before his injury was bizarre in that he was constantly trying to convert other workers to his brand of religion. The foreman states he was a "religious nut" and that during the relief period and during lunch period, the patient would read the Bible. The other employees would kid him about it. The foreman said also that when he would criticize the patient for his work or reprimand him, instead of answering back as a "normal person" would do, the patient quoted passages from the Bible. The foreman said he was a fairly good worker but did have this rather odd quirk. Yet he tended to isolate himself and to be actually belligerent, antagonistic and suspicious. This characteristic behavior was recognized not only by his fellow workmen but by supervisors as being quite out of the ordinary and quite different from that of his associates. Nevertheless, he was allowed to continue on for six years until a minor injury resulted in what has now, after treatment by the company and referral to several noncompany physicians, become permanent disability and a company responsibility. He has no physical evidence of the injury, but he has become very belligerent and paranoid concerning the company, feeling that they have treated him badly. He feels that the union has not given him the support that it should have and he continues to seek redress from the wrong which has been done him. It is not difficult to determine that he has suffered a moderately severe schizophrenic illness for many years and obviously manifested evidences of it long before his injury. Proper evaluation of this man's problem and his discharge or transfer to a more therapeutic environment would have resulted in not only saving the company a great deal of money but in being of great value to the man himself. He probably would have been able to carry on in a less stressful and more supportive work situation.

To re-emphasize, absenteeism, trouble making, drinking, violation of rules, poor productivity, resentment of authority, daydreaming are examples of variant behavior which may be indicative of beginning serious mental health problems. Such manifestations are by no means diagnostic but if persistent should certainly warrant investigation.

Summary

Although this discussion was to have been primarily focused on the recognition of behavior difficulties, that is to say, early mental disease, it seems that much can be learned from military experience with regard to other related factors involved in the occurrence of mental disease in industrial personnel. An attempt has been made to correlate some of these factors. In an explanation of my reason for doing so, I should like to call your attention to a comment made by Oliver Wendell Holmes: "Emphasis on the obvious is often more important than elucidation of the obscure."

Immunization Booklet

The United States Public Health Services announces a new issue of "Immunization Information for International Travel." This booklet contains complete information on immunization requirements for travel anywhere in the world. Copies of the booklet may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. at twenty-five cents per copy.

The Industrial Physician
And
The Depressed Patient

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Following are comments on the kinds of personalities which tend to become depressed, the symptomatology of depression and the management of the depressed patient.

Many psychiatric disease entities are manifest in disguised ways. This is certainly true in the case of the depressed patient. An individual who has been productive, interested in his work, and easy to get along with may, at the outset of a depressive episode, lose his ability to produce, become antagonistic and unfriendly, and may show a personality change that is difficult to understand. Without some ability either to perceive the difficulties which the patient encounters or to understand the dynamics of his behavior, the industrial physician is often at a loss to know how to evaluate the given problem, or to know how to cope with it.

Depression is both a symptom and a diagnosis. By this is meant that almost every psychiatric disease entity contains some elements of depression. On the other hand, we have specific psychiatric disease entities to which we attach the diagnosis: "depression." Whether as symptoms or diagnoses, depressions vary considerably in intensity from one case to another and even from one time to another in a given patient. The less intense, or milder, symptoms of depression are often referred to as acute, superficial, or neurotic reactions. The severe, deep, or psychic depressions are characterized by more dramatic and intense symtomatology and observable physiological signs.

Depressive Personality

Generally speaking, persons who are depressed (or who tend to become depressed) reveal a rather common psychological approach of life. They are individuals who take life seriously and seem to be removed from imagination and humor. They have rigid patterns of behavior, and when once established in a certain pattern, they are likely to pursue it intently and consistently. They work hard at what they do. Their activities may be relatively few in number, but they are extremely wrapped up in those which they do pursue. They are perfectionists and approach every problem with the feeling that it must be accomplished and must be accomplished correctly! For this reason they are sometimes described as "slaves" to their homes, their children, and their jobs. Usually they are so involved in doing things in their perfectionistic way that they have little time for hobbies or for recreation. Sometimes they are lacking in color, charm, and spontaneity. Usually they are sensitive, shy, and seclusive; however, they often are respected because of their conscientiousness, their thoroughness, and their meticulous devotion to duty.

The families of depressive patients also show some common characteristics. They are families which are socially insecure and, at the same time, have intense strivings for social prestige, econnomic success, or similar goals. The children (future depressive individuals) are used in some way to solve the family need. Love is offered or withheld, depending on the families' needs, which are predominantly unconscious. Failure is common because of the unrealistic standards set by parents.

Usually the families are harsh disciplinarians, strict and rigid, uncompromising and punishing

in their atttude. Thus, their children tend to acquire by imitation and also by identification (the superimposition of the personality of the parents) the same uncompromising, rigid, compulsive way of life.

Symptomatology

The symtomatology of depression must be divided into two main categories. These are (1) emotional or psychological symptoms and (2) biological symptoms. Careful examination of the patient will reveal some admixture of these groups of symptoms in almost all cases of depression.

Patients who are depressed, or who are inclined to become depressed, are often quiet and restrained, somewhat pessimistic, and self-depreciatory. As indicated earlier, they lack spontaneity and enthusiasm. They are much inclined to complain of lassitude, feelings of inadequacy, discouragement, and hopelessness. They find it difficult to make decisions and experience trouble in dealing with problems that otherwise would not concern them. They tend to be unshakably concerned over their own personal problems, which they see with varying levels of insight. They feel rejected and unloved, complain of being melancholy.

The melancholy mood is one characterized by feelings of dejection, defeat, and hopelessness. It is often accompanied by an inability to enjoy or to be interested in anything. Thoughts seem to come slowly and concentration is difficult. Sometimes there are ideas of poverty, sin, or delusions of disease. A state of tension often exists in these persons because there is a rather persistent fear of impending doom. Sometimes this tension looms into an acute anxiety reaction, in which case we describe the condition as an "agitated depression." Sometimes the melancholy mood is accomplished by suicidal ideas.

The changes in bodily function which occur in depressions are unlimited; a few of the more common are anorexia, insomnia, changes in gastrointestinal activity, changes in basal metabolism. Currently, some of our ideas, observations and theories about depression can be described as follows: The hypothalamus is the cephalic representation of the autonomic nervous system. It is connected with the cortex indirectly through the thalamus, and is connected directly with the peripheral autonomic nervous system at its lower centers by afferent and efferent fibers.

By virtue of its position and connections, the hypothalamus integrates the activities of the viscera, the endocrine glands and smooth muscles, and emotional expressions with reference to the needs of the entire organism. Such regulation and integration maintain what Cannon refers to as homeostasis in the normally functioning person. When depression is recognized cortically, it may be expressed peripherally by way of the hypothalamic controls, that is, through the mutually synergistic action of the sympathetic and parasympathetic nervous systems. It is in the effort to maintain homeostasis that we observe changes in bodily functions.

Two cardinal physical symptoms of depressive reaction are anorexia and insomnia. The history of sleeplessness or loss of appetite, or both, is often said to have been the first indication of an impending depression. The depressed patient has little inclination to eat and usually takes nourishment with reluctance and after much persuasion. In spite of the great need for sleep, sleep habits are grossly altered. The patient often awakens early in the morning and lies for hours, sleepless, tormented by painful ideas, only to complain the next morning of being dazed, worn out, and weary. Sometimes the patient will remain in bed for hours or days at a time and still complain of not being refreshed. It is generally agreed that depressive patients are distracted by the content of their thinking and cannot sleep. By the same token, the patient may feel himself so unworthy that he does not consider himself entitled to food offered him. He either refuses food or states that he has no appetite for it.

As a consequence of anorexia and insomnia, the body weight diminishes. There is a marked decrease in body weight early in depressions, becoming stabilized at a level well below the usual weight as the depression becomes protracted. An increase in body weight and the return of interest in food are frequently early signs of improved mood.

Other frequent early physiological changes in depression are a slowing of the pulse and respiratory rate, lowering of the basal temperature by one or two degrees, a cessation of or irregularity of the menses, and certain "nervous disorders," such as headache, fatigue, and tinnitus. Some authors have noted an increase in the number of red corpuscles, inhibited excretion of uric acid, and glycosuria. All of the changes indicate that in the depressed state a disordered metabolism must occur.

Various investigators have pointed to the consistently low basal metabolism found in psychoses in general and in depressive reactions in particular. Other investigators have reported mild to moderate hypertension and slowing of the pulse in depressed patients.

Another important phenomenon in depressive reactions is that of changes in the gastrointestinal function, seen particularly in gastric secretion, tone, and motility of the bowel. It appears that the depressive emotion exerts an in-

nibiting effect on the gastric secretion with a resulting anacidity. This probably is not symptomatic in itself, but may play a part in the overall digestive problem of the patient. Perhaps the indifference, the preoccupation, and neglect of bodily sensation so characteristic of the depressive patient initiates a vicious cycle, namely: faulty mastication, insufficient food and water intake, constipation and stasis, and secretory disturbance.

Depressive reactions are likewise associated with hypotonicity and hypomotility in the gastrointestinal tract. Roentgenograms and fluoroscopic studies in these cases reveal large dilated bowels which are slowly moving. Barium retention for more than 5 hours has been observed in as high as 68% of depressive cases.

Dynamics

The psychological background for depression (that is, the "setting of the stage") occurs early in the development of the personality.

The young child, both physically and emotionally dependent on his mother, expects her to be always in attendance to help satisfy his needs. It is, of course, physically impossible for her to be present at every moment. Her announced absence will produce anxiety in the child. An unannounced absence will be even more threatening, particularly if he has had no reassurance of her eventual return. To lose this source of security leads to anxiety, and such a frustration is always accompanied by anger and feelings of helplessness.

A similar situation is seen in the family which places high expectations in their children. This is the family which is described as characteristic of the families of depressive individuals. The children in these families who do not succeed or meet their families' expectation then feel partially rejected and experience a withholding or loss of love from the family. Again this results in anxiety and anger.

Guilt is another important factor in depression. In the past we have felt that the conscience and subsequent feelings of guilt were developed after the child had established some identification with the parent of the same sex, at age 3 or 4 years. However, we have come to look on relationships much earlier in the life of the child as being important in the establishment of the conscience. Certainly the mother, through her expectations and limitations, impresses the child with her concept of what is permissible and good. What is not acceptable to mother is not good. To be angry with mother, to depend on her, and at the same time to fear losing her love is a complicated guilt-producing situation.

In persons who have experienced this set of circumstances there is a sort of psychological preparation for depression. To lose in interpersonal relationships later in life or to lose loved ones, health, money, or even to experience a fantasied or threatened loss, is to become reacquainted with the initial loss of love in early childhood. The real or imagined stress situation in the present produces the same complex psychophysiological response to the past.

Thus, to lose anything which is held dear is to be scared and angry. Since the person's basic personality pattern is one of compulsive, rigid control over his feelings, he is unable to express his angry feelings outwardly. Consequently, these feelings are absorbed or introjected in the personality. When these feelings of hostility are directed toward this individual, he is, in effect, angry with himself instead of being angry toward the world around him. When he is angry with himself and depreciates himself, he sees little hope in the future. This is depression.

Management

The management of depressive reactions presents some problems which require careful consideration. It would be easy for the nonpsychiatric physician if he could simply refer his depressed patients to a psychiatrist. This, however, is not only impossible; it is impractical and would not necessarily serve the best interests of the patient.

Management of the depressive patient in the office of the family physician is a matter which logically can be divided into three distinct categories: (1) the evaluation of severity of intensity of depression; (2) the medical management; (3) psychotherapeutic assistance.

Depressions are common; however, the multiplicity and the diversity of the symptomatology often confuse the issue. We believe depression should be suspected when we find one of more of the following conditions:

a. Sleep irregularities, particularly early morning awakening(and vague physical complaints such as "pressure in the neck" or headache.

b. An attitude of pessimism or discouragement.

c. A generalized psychomotor inhibition such as decreased motility, poor concentration, or slowness of thought.

It is often difficult to decide about the depths (intensity) of a depression. Perhaps it may be of some comfort to know that relatively few mild depressive reactions result in bodily harm or suicide. Suicide more frequently occurs in severe or psychotic depressions, which are often accompanied by anxiety and numerous somatic delusions. It is our opinion that if a patient appears to be depressed enough to hurt himself, or if he verbalizes this intent, in all probability

psychiatric consultation is in order. If it is not available, probably hospitalization should be recommended to protect the patient.

A depressive patient should be given a careful physical examination and any specific medical problems—including those that are manifestations of the biological components of depression—should be treated actively by the doctor in the same fashion that he would treat any other patient who experienced these problems.

There is a continuing deluge of new drugs on the market that are said to be indicated for depressive emotional reactions. Caution must be used, however, in the long term administration of the energizers or tranquilizers, for some are depressive in themselves. We have found it helpful to treat mild depressive reactions with some mild stimulants, at least for a short period of time, and for the specific purpose of helping that patient feel a little more comfortable in talking to us about some of his problems. The drugs should not be used as a substitute for adequate clinical evaluation of the patient and his environment.

Psychotherapeutically, one should approach the depressed patient with interest, supporting and comforting remarks, aimed at an understanding of why he is depressed. Basically, the physician should remember that the depressed patient is struggling with a hostile problem and profound feelings of loss and isolation. If the doctor feels himself emotionally strong enough to face this kind of a problem and feels that the patient's past personality adjustment is satisfactory, he may elect to work with the patient through interviewing.

In the psychotherapeutic situation the doctor has the responsibility of learning as much as he can about his patient. This knowledge must be shared judiciously with the patient, as the patient develops his own curiosity about the motivations in his behavior. The patient's feelings, his attitudes, his relationships at home, and, of course, his relationships in the original family setting are extremely important. Any current depressing situations in his life, such as financial reverses, job changes, loss of loved ones, separation from loved ones, or change of life are factors that should be evaluated carefully, and the patient given as much support as possible.

In many patients suffering from depression, the hostile problems and the problems of his personal loss are never dealt with by direct discussion. The patient is merely supported by a warm, understanding physician. On the other hand, the family physician can and should deal with the angry feelings when these hostile expressions come forth. If the therapist can approach his patient in a strong understanding and supporting manner, he has the opportunity to treat those basic psychological problems from which the depression has come.

Psychotherapy has three phases—evaluation, treatment, termination. The doctor's role begins as a parent-like figure who protects and limits the stresses on the patient. Ideally, as treatment progresses through increased participation by the patient, the doctor becomes a counselor and the patient is permitted, encouraged, and expected to assume a more and more mature role in the therapy. At some point the patient may reach the "moment of decision," in which he declines to explore further the deeper connections and memories about hostile feelings toward present or past significant figures in his life. Here the doctor must accept the patient's decision and plan termination of the interviews, usually well in advance with depressed patients, in order to minimize their feelings of abandonment.

The physician who will take the time to listen often will find that feelings of guilt, anger, and isolation will be admitted and partially resolved by these admissions. The physician who can help his patient see how his attitudes have developed and support him in his acceptance of them is a psychotherapist.

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PSYCHIATRY IN INDUSTRY

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Only by careful coordination of the efforts of management and health experts can a successful emotional health program be established in industry. Slogans, tests and pretty brochures are not a substitute for hard work and common sense.

Mental health services in industry should be viewed for possible contribution to the basic program of the industry. While any health service is of theoretical social significance as a force for betterment of the world in which we live, more practically, health programs are related to employee morale and productivity which bear important relations to the basic purpose of any industrial enterprise; to produce a product at a profit. The goals of the mental health portions of the program are the same as the other parts of the industrial health program and should be part of it. The goals: (1) The promotion and improvement of the emotional health of workers and management. (2) The detection of signs of emotional stress or distress. (3) The relief of stress where possible (first-aid), to prevent the problem from becoming more severe. (4) The treatment of employees suffering from mental illness or provision for treatment elsewhere. (5) The rehabilitation of those who become ill and who recover sufficiently to return to work. Numerous industrial physicians[1,2] have discussed the importance of the mental health program in industry and Ross[3] in a recent article provides examples of how a mental health program can help reduce absenteeism, accidents and alcoholism — three of the major health hazards in industry. This paper will be about management sponsored industrial health services, and will deal with prevention, early detection, and emotional first-aid, and not with the treatment of mental illness or the rehabilitation of recovered patients, as these last two services are not commonly part of the plant operated program. For our purposes in this discussion, a person can be considered mentally healthy if he can cope successfully with the life situations he meets at home and at work, and derive a reasonable amount of satisfaction from his home, his work and his leisure time activities. Most employees spend less than 25% of their life at work, but in adult life it may be the principal contact outside the home. In a way, work behavior is an observation window into the personal life of the individual and affords a view of his general health and conduct not otherwise available to the employer or the rest of the world. A man's capacity for healthy living in a mental sense is determined by his heredity, his life experiences, his general health, his education, and the resources and problems of the particular world in which he lives. Some people find within the job setting sources for personal needs not met at home; others, with supporting circumstances at home, can tolerate unfortunate or crisis situations at work without showing pathology. Thus situations which will produce pathology in a given person vary substantially with the general character structure of the person dealt with. In the working off of tensions encountered in the external world, some people become unusually energetic and conscientious employees, while others react pathologically in the work situation. One cannot reasonably expect industry to compensate for all the unhappiness that a man may encounter in the outside or the industrial world, but fortunately the very elements in a job that make the work situation healthy are the same elements that give support to a person who

brings tensions and problems to his work from his personal life. Some of the elements within a work situation conducive to mental health and others that tend to produce mental illness will be discussed.

Self-Respect

A worker needs to feel accepted within his working group. Each man, within himself, must feel he is important to someone. He must feel acceptance of his own unique person; acceptance of himself. If for any reason of religious, racial or personal difference from the group he feels that he is not liked or accepted, he will react in a variety of ways depending on his own personality and past experience. For example, such a worker may withdraw and become isolated, having little personal contact with his fellow workers and, in extreme cases, he either quits or has many absences. Another person of different temperament may become aggressive and delinquent in an effort to call attention to himself, because for some persons any kind of attention, even critical attention, may be better than rejection. Alleviation of feelings of rejection may be achieved by assignment to special jobs, placing him on some planning committee or other measures designed to make him feel accepted and a member of the group. The supervisor may be able to persuade the informal leader of the working group of which the patient is a member to include him in more of the casual conversation. Often such small openings are enough. Some require more persistent effort. Ling has expressed it "to enable people to remain mentally healthy and at peace with themselves they must feel that what they do in life matters."[4]

Related to this sense of personal acceptance is the need to feel that the work being done is important. In a complicated industrial plant the task of every person from the cleanup man to the design engineer is one of importance to the final success of the project. The important task of supervision is to make workers feel that they are important to the project and that when they fail to do their task effectively the work of the whole group is impaired. The worker who feels that he is personally accepted by his team, that he will be missed and his friends on the job will be inconvenienced if he fails to show up, is more apt to come to work when he has a mild cold or a severe hangover than the worker who feels he is contributing little and that his absence will be missed only by the timekeeper.

Security

A worker needs a sense of security, a sense of emotional or personal security. Such sense of security is extremely important in management and the greater the responsibility of his position the more important becomes his feeling of having a place in the organization and confidence in his own ability. Studies of workers' relationships in hospitals and in industry show that many of the problems within the employee group originate in feelings of insecurity, of being threatened.

A supervisor who is not very sure of his own skill or of the confidence of his boss is prone to be overly critical of an errant employee, because he fears that he will be criticised by his own superior if he allows too much leeway in the behavior and performance of those working under him. His over-reaction to the delinquency of the offending employee will often be met with anger by the victim, which may be expressed openly or, perhaps more seriously, by inward resentment and "fuming." Because most employees are conscientious and will be suffering from guilt feelings at having committed the error, the aggression of his superior threatens him further, making him more tense, but the act also relieves his guilt feelings to some extent. The offender with guilt relieved may react by turning his aggression back on the superior whom he now believes is misunderstanding and mistreating him. Another supervisor, more secure about his own competence to do his job, is apt to give the erring workman a chance to explain his side of the present situation, which may accentuate the worker's guilt feelings. With guilt feelings at work, the supervisor can reprimand the employee according to the significance of error, and the end result will probably be an improvement in the future relationship with the employee, rather than the reverse.

Responsibilities

An important contribution to the mental health of an employee is a clear concept of the responsibilities, duties, and privileges he has in a particular work situation. Many industrial organizations pride themselves on their competence at management and organization, but it is not uncommon to find persons in industry who are assigned jobs without explicit instructions about where they may look for guidance or help. In such a plant a new employee may also have an unclear concept of what is expected of him. Poor integration into a job can occur at almost any level of employment. In such confused surroundings most persons turn to fellow employees for advice and guidance and their guidance may or may not be just what management expects. Obviously a person who works with a concept of his job that differs from his supervisor's expectations will find himself in situations that are difficult and the source of severe emotional stress. As man-

agement practices have improved, situations due to inefficient job description and role assignment occur less often, but occur they do and far too frequently for most efficient cooperation.

Place in the Organization

Clear-cut lines of authority are important, particularly as one gets into higher echelons of management in large and complex business operations. At the lower level the production line worker's relationship to the immediate superior is reasonably clear. In the higher echelons of management, lines of authority may become a little vague and an employee may find himself working for two or three different bosses. The "top brass" may go over or around a subordinate to reach somebody at another level, usually with the professed intention of "greater effectiveness," but such a motivation is suspect. A person given responsibility and authority must also be given support by his superiors and a relatively free hand within the general policy that is stated at the time of the delegation of authority. It is further important that the lines of authority in the administrative system be defined and separated from the staff or advisory functions that are prominent in large technical operations.

All of the items are well known to management and are often well presented in expensively printed brochures, but consulting with persons who come from industry shows that confusions in line of authority and in poor delegation of authority are common. Further confusion of staff and administrative functions are a common cause of stress among the personnel. Occasionally some large company or agency intentionally divides administrative responsibility and authority. This seems to occur when the operation of a unit is of a highly technical sort, such as a research organization, a hospital, or a university. Some person, well intentioned but not too wise, may come up with the thought that these professional or technical people should not be involved with business matters, and that knowing nothing of business the business organization should therefore be separate and outside so as not to interfere with the smooth technical operation and so "business" may be done in a "business-like" way — whatever that is. Overlooked is the fact that the smooth technical operation cannot go forward unless such business matters as janitor service, distribution of telephones, delivery of supplies, moving partitions, purchase of equipment, etc. are geared to the technical problem.

In my opinion, the best way to insure executive discontent and ineffective operation is to remove administrative control from the technical people and set up a "split administration."

Hope

Employees need to have some concept of what the future holds for them in a particular company. Workers who move from one company to another do so because they feel that the future holds more for them in the new area. This "future" may be better opportunity for promotion, for job security, for higher pay or some other real or phantasied personal advantage. The highly competitive and insecure position of the junior executive partially stems from unclear concepts of what the future may hold for him in a particular company. Some thought in planning and informing subordinate persons of the means and ways of working up through the administrative echelon, what the future opportunities are, can do much to promote individual security.

Problems

Studies by sociologists show that persons working in groups will establish their own informal system of leaders and devise ways of getting work done as required by the management, if actual leadership is not supplied by the designated supervisor. Work groups can help maintain mental health in the individual if the employees develop allegiance to the group and find within it some of the ordinary human satisfactions listed above. When employees do not find reasonable satisfaction within the group, they tend to become isolated from it, or cause dissension in their fellows. Firing the maladapted person or transferring him merely postpones the final handling of the problem. Argyris[5] writes that the organization of the modern industrial plant, under the best of circumstances, tends to produce emotional stress in the personnel. The administrative patterns now thought to insure high productivity may have within them elements which run contrary to our present knowledge of the elements needed for efficient functioning of human beings. Perhaps a plan based on applying to the industrial situation basic knowledge of dynamic psychiatry and sociology would improve the general mental health and productivity of employees. At least such a hypothesis is worthy of testing in the industrial setting.

Poor Emotional Health

Signs of poor emotional health are familiar to most personnel men, supervisors, and plant physicians. Ineffectiveness of the employee is the usual result of severe emotional stress, and this ineffectiveness is usually due to absenteeism, accidents, illness, "colds," "muscle strain," alcoholism, poor morale, or plain lack of desire to work. Serious signs of stress in a plant are

multiple resignations, high accident rate, trouble-making employees, low productivity, and damage to equipment. Attempts to relate productivity to emotional health do not always show a positive correlation[6] but studies in this area are few. Administrative studies of hospitals seem to show improved employee attitude increases the therapeutic effectiveness of the hospital, and a greater discharge of recovered patients may be akin to the "product" of a manufacturing industry.

Work now in progress[7] shows that an individual worker's absenteeism and illness pattern develops early in his work career and that different patterns are characteristic of the individual. Some of these differences are related to the sex of the worker and to accepted patterns of behavior for persons of certain types. Illness among industrial employees follows a cluster pattern for each individual,[7] and these illnesses tend to be of the same general type. The clusters of illness are correlated with periods of personal stress rather than with working conditions, climate, or exposure to industrial hazards.

The Community "Outside"

The above discussion deals with situations within the industry. It is obvious both to industry and employee organizations that an important part of a health program is the emotional climate of the community in which the industry exists. It thus behooves the leaders in industry, their medical staffs and the employee organizations to participate in the activities for betterment of the community. Fostering work opportunities, and recreational, educational and health facilities within the community are important first steps in setting up any preventive program in the field of mental health. The economic, emotional and moral climate of the community have an important bearing on employee health.

Emotional First-Aid

In spite of the efforts to prevent the development of emotional crises by management operations, some will occur. Therefore, the health department or the personnel system must develop some kind of emotional first-aid program. This is sometimes called "secondary prevention." As a physician, I believe this aid program should be under the direction of the health service. As Ross[1] has pointed out, "There is no question as to whether an industrial physician will or will not deal with emotional and social problems in a factory. The only question is as to whether he will deal with these effectively or not, and whether he will or will not make use of currently available attitudes and techniques and knowledge towards his more effectively dealing with such problems in factories."

An important facet of an emotional first-aid program is providing some way for an employee to "blow off steam," to ventilate his grievances and, if possible, aid him to bring about some solution which will prevent chronic emotional stress. Supervisors at the lower echelon will do much to prevent many major problems if they are secure enough in themselves and skilled enough to permit temper tantrums and outbursts of profanity from angry employees to go unchallenged for the moment, postponing discussion until the heat of anger has subsided. At this later interview limits may also be set for future behavior, and penalties agreed upon to be assessed for similar violations in the future.

In addition to this safety-valve mechanism, there should be available a company nurse, a counselor, or a physician to whom the employee can go in confidence to discuss his personal grievances. This operation has two main values. In the first place, in discussing the grievance the employee frequently gets a new slant on it and often wants to do nothing further about it, or he may see what his own contribution has been to the situation and rectify it. Secondly, the employee often feels better after he has been able to "get it off his chest" and, on second thought, decides the matter is not worth continuing. Supervisors, nurses or counselors doing emotional first-aid should have a psychiatrist available for consultation. If a psychiatrist is not available in certain sections of the country, the industrial physician should ground himself in the rudiments of psychiatry for consultation purposes so that he may handle these problems and decide who should be referred on to centers where psychiatry is available. If it seems that the situation is a chronic recurring one within the organization, the physician may see fit to call it to the attention of his administrative associates, with the intent that management rectify the situation.

As is well known to management, problems of an emotional sort have a tendency to crop up in particular sections or echelons of any organization. In such cases one should look to the persons in the supervisory position. It may be found that the person in the supervisory position does not have the ability to build into the work situation conditions which promote emotional health. As an example, persons with outside problems often bring their problems to work with them, and an understanding and supportive supervisor, or understanding and supportive fellow employee may help him work these problems off on the job, at times with the fellow employee not being aware that he has a problem. At times the supervisor may be so insecure himself that he cannot give any real support to his employee. At other times the supervisor is himself so neurotic or

under such personal stress that he may cause the pathology within the work situation.

Psychiatric first-aid should be available to employees in all echelons of an industrial organization. Persons in major executive positions should have access to a broadly educated person, if possible a well trained psychiatrist who understands group and public health matters. Supervisors and lower echelon employees also need persons with whom they may discuss their problems and ventilate their insecurity. A trusted figure of support and guidance may be someone within the medical department, but within some industrial frameworks counselors working in the personnel division have been successful. The industrial psychiatrist or the counselor should not advise personnel or management on administrative problems, but rather should advise them about their own blind spots in relation to themselves and to other people so they can use this knowledge meaningfully in arriving at their own decisions.

Perhaps one of the most difficult management decisions is to support persons in a lower echelon when that person has made a decision or carried on an act with which they do not entirely agree. Top management must share the responsibility for errors of subordinates and not tend to treat their own insecurity by "passing the buck." Rectification of the situation within the particular administrative unit should be done privately and without the knowledge of those outside that unit.

Many persons writing on administrative counseling and mental health in industry recommend that interviewing techniques be taught to personnel at the lower supervisory level. This can be helpful if the interviewing technique is used in a clearly defined way to allow personnel to express difficulties, to make complaints, and to ventilate their own immediate stresses and anxieties. It should not give the supervisor a feeling that he is equipped to carry on therapeutic interviews. Mastery of interviewing techniques can also aid the supervisor to hold the interest of his employees in discussion and to build up their confidence in his leadership. In conducting group interviews the leader permits each person to express his own ideas and suggestions, render his complaints and define them until the issues are definite. After discussing the agreements and objections to a proposed plan, at the end of the interview specific and clearcut decisions should be made so that people can have a clear view of the goals of the group and of the performance expected of them.

Tests as an Aid to Mental Health Promotion

Tests are widely used as a management tool in some organizations, particularly in the personnel program. From a health viewpoint, tests are useful provided they are used with a specific goal in mind and with the full knowledge both of their strength and their limits. To place primary reliance on a test that does not make an interpretation that fits the rest of the evidence is most unwise. In consideration of any personnel problem, a test as one factor to be considered may be very important, but experience does not support the use of tests as the principal decision making tool. In higher echelons the use of observations of the employee in role playing technique has been advocated.[1] Important decisions about promotion to increased responsibility and similar decisions can best be made by observing persons in their daily work and using this experience for prediction of their performance in the new job. Multiple observations brought to bear on personnel selection proceedings increase the probability of correctly predicting future performance.[8]

A series of tests with multiple discussions by supervisors who have had the employee in their department, combined with the work record of the employee, is a better procedure for deciding the mental suitability of an employee for a particular task. There is available a series of charts organized into a recording system that, properly used, may increase the objectivity of the supervisors, but one must be certain that the supervisors maintain their level of interest in the recording after being properly instructed in the use of the system. If the recording of the chart becomes an onerous task there may develop a tendency to repeat the previous observation, or the supervisor may make random variations, not accurately recording the employee's behavior but recording his own preconceived idea as to how the chart should look. Tests play a less important role in the selection of people for major management positions. If a major industrial post is open and if top management people have surveyed the field and selected three or four persons as the best candidates for the post, and then subject these three or four people to tests to select "the best one" they are wide open to operation by unscrupulous or poorly informed persons who do not recognize the limitations of their methods. It is more than likely that any of the final candidates selected could adequately carry out the job, and the "tester" may choose the one who most nearly fits his own concept of what the job should be. If management could outline specifically for a job the personality traits needed by a person of particular background, temperament, age, sex, etc., then tests could be of greater help. Business firms often report satisfaction from selecting personnel from tests for the reasons

mentioned above. Any of the persons the tester examines in these circumstances could probably do the job. So far as I know, no one in top management has ever picked from among the top candidates the candidate least likely to succeed, according to the tests, but it would be less hazardous than you think.

In summary, tests may be helpful, but like any laboratory test in medicine are not infallible. They should not blunt one's clinical judgment but rather tests are properly used to sharpen one's method of observation.

The Care of Persons Who Develop Illness

Part of the industrial mental health program is the treatment of those persons who become seriously ill, and another part is the rehabilitation of those who become ill and recover sufficiently to return to work. In most agencies this is handled by referring the patient to outside psychiatrists. In referring persons to an outside psychiatrist there are some general principles to be observed. In the first place, sending a person to a poorly trained psychiatrist may be worse than not referring him at all. Good treatment usually takes a long time. If persons are to be referred for psychotherapy, a long term proposition in itself, the patient should continue in his job if his behavior permits. The company doctor must insist that the patient choose a person who is by training and by reputation a competent psychotherapist. Some physicians do "psychotherapy" by endlessly chatting with patients during the interview hour and accomplish nothing. Since even the best psychotherapy tends to take months and at times years, it is not efficient to assign patients to an incompetent therapist and then, after many months, come to the conclusion that maybe the physician does not know what he is doing. The best therapists will have many failures in long-term, difficult, dependent and neurotic persons. It is essential that the referring physician have confidence in the therapist selected. If necessary, consultation should be held with persons of well established reputation as to a therapist capable of treating a particular patient.

Research Needed

The conclusion from this discussion is a recommendation that research work in group management in different industries be expanded. Industries employing large numbers of machinists or handworkers or construction workers, where persons work in larger groups, must have different problems than a chemical or power plant where most of the work is done mechanically with skilled operators working alone or in very small groups. Whatever the distribution of employees, we do know that the employees of a hospital or industry make up a significant social system that has self-perpetuating properties of its own and these properties must be better understood if we are to work effectively in improving administrative effectiveness.

Summary

It is possible to promote emotional health in any industrial setting, but to do so takes careful planning by persons who understand the workings of individuals and of groups. The health service must collaborate with persons in management who understand the situations in the particular industry and in the particular plant of the industry where the program is to be organized. Only by careful coordination of the efforts of management and health experts and by continuous supervision can a successful emotional health program be established in industry. Further research is needed to increase our knowledge of industrial psychiatry. Financial and human resources involved make it worth while for industry to continue to expand the development in this area. Slogans, tests, and pretty brochures are not a substitute for hard work and common sense in organizing any kind of health program. Good intentions are not a substitute for competence or for professional training.

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OCCUPATIONAL REHABILITATION

Following Mental Illness

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Work is an integral part of human functioning, and it provides channels of expression for the fulfillment of physiological and psychological needs. Satisfying these needs in a socially and economically permissive environment is a decisive factor in the individual's mental health.

The motivation for work and the choice of vocation reveal both conscious and unconscious efforts toward self-realization. On the level of conscious adaptation work offers the individual opportunities for personal accomplishment, achievement of security, social recognition, and a basis for his plans for family life. Unconscious forces often express themselves in the identification with family figures or patterns, the impulse to mastery, the innate drive to creativeness, and the discharge of strong aggressive energies. Interference with the fundamental disposition to work, whether from intrapsychic or extrapersonal causes, hampers personality growth and impedes social integration.

These considerations take on heightened significance when the individual's work is interrupted by mental illness. Occupational therapy constitutes an integral part of psychiatric treatment during the active and convalescent stages of mental disorder. With improvement and recovery, the principle that the handicapped person should be given work for ability, not disability, applies equally to both physical and mental illness. But mental and emotional disturbances involve the operation of the total personality to a much greater degree than predominantly physical conditions, and this may complicate the rehabilitative process in many ways. Unfortunately the element of predictability in respect to duration and prognosis of illness cannot be as well defined in psychiatric disorders. Because of individual differences and the fact that support and understanding from others usually is of key importance, it is impossible to provide any standardized approach for all cases or even for the same diagnostic subgroup. Successful re-employment after mental illness begins with open channels of collaboration between the industrial physician, the personal physician, the consulting psychiatrist, the hospital or sanitarium, and representatives of rehabilitation agencies.

One misconception that often adds to the complexity and confusion surrounding this problem is the notion that individuals who have had mental illness make up the majority of the substandard workers who perform below optimal levels of competence. It is true that certain maladjusted individuals with personality handicaps and character defects constitute special problems in the community, in the courts and in the clinics attached to the courts, as well as in industry, but these marginal people should be sharply separated from the mentally ill who are capable of profiting from psychiatric treatment. With this reservation, it can be safely stated that when properly placed, the patients who have improved or recovered from mental illness can be expected to parallel the satisfactory and often excellent work record of the physically handicapped.

The influence which mental illness has on work habits or skills is a highly individual matter,

and it may be evident on a wide range from no significant effect on one extreme to total and permanent disability on the other. However, as in physical illness leading to some degree of handicap, severe impairment is confined chiefly to the acute or clinically active stages of the mental disorder. Again as in physical illness, early recognition and intensive psychiatric treatment within the first few days or weeks after onset are both highly favorable factors in the prognosis for rehabilitation.

Out of the great constellation of factors involved in re-employment after mental or emotional illness, the following five seem to me to be of greatest importance: (1) the age of the patient at the time of onset, (2) his personality background, (3) the clinical diagnosis and the course of the illness, (4) the treatment and discharge procedure, and (5) the attitudes of the patient, his family, and his employer.

The Age Factor

As with physical handicap, the age at onset of the illness may have considerable relationship with occupational choice and motivation for work. Schizophrenia, having its onset generally in young adult life, is particularly crippling in this regard, since it restricts or eliminates opportunities for work experience just when the basic work habits and skills should be acquired. However, if the schizophrenic patient has acquired acceptable work habits and occupational skills in his premorbid period, the possibilities of rehabilitation in the same or a related type of work are greatly improved.

Fortunately, most of the other major mental illnesses have their onset after the second decade and thus after early work habits are acquired, with the result that choice of vocation and training are not interfered with to the same extent. The psychoneurotic episodes and the depressive reactions which occur in the middle years generally do not call for prolonged treatment away from work—on the contrary, for many of these individuals a prompt return to work may well constitute part of the therapy. The special personality traits found particularly in women who, when wedded to a job, develop involutional psychotic reactions, namely, self-sacrifice, conscientiousness, obsessive tendencies, and rigidity, often make these individuals very dependable employees. In addition to work, their psychotherapeutic reorientation must include regular vacations, recreation, and more balanced socialized outlets for accumulated frustration.

Rehabilitation of individuals who have a mental illness in the pre-retirement period is related to the larger problem of assisting them to prepare for a change of pace without excessive emotional reaction. This applies not only to the functional type of disorders but to some of the milder organic and hypertensive syndromes as well.

Personality Background

Work adjustment cannot be appraised apart from the individual's basic personality structure. The occupational history is inseparable from the other psychosociomedical aspects of the individual's case history. Factors dating back to early family background which influence success at work are fairly well known and their understanding is as important for the placement of the mentally ill after recovery as it is for all persons seeking employment. The familiar saying, "People take their childhood with them to their jobs" applies even more to psychoneurotic patients than to others. The solidarity of the family unit gives a basis for the "group belongingness" invariably found in the vocationally well adjusted, and lacking in those who are incapacitated for work. Some work habits and interests are rooted in the play activities of the child. It is readily conceivable that many of the qualities used later to measure efficiency and productivity at work are evolutionary outgrowths of parent-child relationships. The joy of achievement, the acceptance of responsibility and rules, persistence in the face of frustration, a consideration for personal safety, the discharge of aggressive and erotic drives through socially reinforced sublimations, all are conditioned by identification and approval or disapproval of authoritarian figures, long before the individual seeks a job. Mental illness does not materially alter the tendency to repeat early patterns of reaction based on relationships with parents and surrogate authority figures or ideals.

Telltale symptoms of mental illness often make their appearance at home some time before they become evident at the place of work. Fear, indifference, or unwillingness to face the fact of personality change by those who are closest to the patient may delay effective intervention until after a work failure occurs. Final inability to carry on at work is usually closely associated with some social crisis in the home environment, and there may also be excessive concern over physical symptoms. Occasionally a patient with a paranoid illness will evidence delusional projections on the job before they have become evident elsewhere, but this is exceptional. A search for background factors will invariably disclose that occupational stress by itself does not cause, but merely uncovers, symptoms of a mental illness. Industry of course shares with the family a responsibility for the earliest possible recognition of personality changes which

are inimical to satisfactory job performance, just as in physical disorders. This applies both to the initial onset of symptoms or to a recurrence following a period of re-employment.

Diagnosis and Clinical Course

Industrial physicians, rehabilitation counselors, and other employment officers should be wary of using the psychiatric diagnosis as the sole basis for re-employment after mental illness. Whether it is applied at the beginning or at the end of the episode of illness, the diagnostic label must be supplemented by information concerning the effect of treatment procedures on the clinical course. The Diagnostic Manual of Mental Disorders now in use by practically all mental hospitals recommends that the individual's pre-illness capacity in terms of occupational and social adjustment be used as a base line for estimating the degree of impairment which remains after termination of treatment. The degree of impairment is to be designated by the terms: none, minimal, mild, moderate, or severe. Minimal impairment indicates an estimate of not more than 10% incapacity; mild impairment, 20 to 30% disability; moderate impairment, 30 to 50% disability; and severe impairment, over 50% disability.

The duration of psychiatric illness and the length of time away from work are highly individual problems, depending on a number of variable factors. Prominent among these are diagnosis and the response to qualified treatment. The following estimates of the duration of illness are examples of the more common psychiatric conditions coming under intensive outpatient and sanitarium care. Moderate to severe depressive reactions usually require continuous care for four to six weeks. Follow-up care and convalescence at home for an additional two weeks are generally required before the patient is ready to return to full employment. Obviously, if therapy is less intense and less individualized, the time required for full recovery may be longer. Involutional psychotic reactions may also be returned to work within six to eight weeks. Hospitalization for acute psychoneurotic episodes often need not extend over two or three weeks, since early return to employment is desirable in these cases. Treatment should be psychodynamically oriented.

The problem of estimating the duration of schizophrenic psychoses is difficult because there is no way at the outset of differentiating the acute episodes with a favorable outcome from those which progress to chronic stages. If the residual personality handicap is not severe, some chronic schizophrenics can be re-employed on simpler levels of skill. They often accept work in relative isolation on assignments that are far beneath that expected on the basis of their pre-illness education and attainments.

The tendency to relapse which is characteristic of manic-depressive psychosis may present some problems in after-care, even though the acute episodes respond satisfactorily to treatment within one to two months. In general there is a tendency to a less favorable vocational adjustment after the third relapse, especially if the recurrences are in fairly rapid succession over only a one or two year period. It is understandable that employers will be reluctant to rehire such individuals, particularly if their jobs carry supervisory responsibilities, without reasonable assurance based on treatment that early relapse is not probable.

Physicians and psychiatrists are understandably reluctant to use the label of alcoholism, and this factor is often hidden under some coincidental physical condition, psychophysiological disorder, or psychoneurotic reaction. The problem of alcoholism is a notoriously difficult one, and treatment in industry often requires continuing contacts over considerable time with all key personnel involved in the program.

Treatment and Discharge Procedure

As previously mentioned, the prognosis for mental disorders is favorably influenced by early recognition, effective referral, and the prompt institution of active therapy. Return of the patient to the community and to his work is closely related to the rehabilitation procedures of the facility where psychiatric treatment is given. Ideally, it is the responsibility of the psychiatrist and the hospital staff to continue contacts with the patient until he has established satisfactory readjustment to his family and to society. The convalescent period of several weeks' duration is utilized for such follow-up psychotherapy and preparation for return to work.

If relapse occurs during the probationary convalescent period and rehospitalization is necessary, plans for re-employment will need to be deferred, but they should by no means be abandoned. In general, it is true that after the patient has experienced successful treatment of his initial illness, the time required for treatment of recurrent episodes of the illness tends to be of shorter duration. Some special considerations need to be introduced when electroshock is used, but with adequate convalescence and follow-up, the rehabilitation and re-employment process is essentially the same.

Attitudes of Patient, Family, and Employer

Usually, desensitization of the patient to his mental illness is accomplished if he is able to

receive adequate insight, but this is a gradual process and his full recovery is not complete until his social and vocational adjustments are satisfactory to all concerned. The feeling of being an outcast and being an object of mistrust is often intensely disturbing during the first few days after returning to work. Even after a patient's original ability to work is restored, he may occasionally experience uneasiness and tension from the knowledge that his illness is still looked upon questioningly by his supervisor or his fellow employees. Often this state is productive of minor inefficiencies which still further reinforce the misunderstanding. Industrial personnel should be aware that patients themselves may share the traditionally pessimistic outlook concerning mental illness. Reassurance that their former capacity for work is unimpaired may be of great benefit to them.

As has been mentioned, the major causative factors are related to the patient's emotional adjustment off the job, and it is for this reason that the family or key individuals in his life must be a part of the rehabilitation plan. The patient needs to face the fact that he is being returned to the same family constellation in which his illness occurred, and that certain factors contributing to his breakdown may still be in operation. Expectations of the family with regard to the patient's return to work are not always in agreement with the plan which is best for the sake of his mental health. It is unfortunate that due to inadequate contacts, a hiatus often exists between the therapist, the family, and the employer.

The attitude which most employers have toward re-employment following physical illness or injury is usually tempered with cautious reservations when the problem is one of mental or emotional illness. Although much educational work remains to be done, there are encouraging signs of a transition from the traditional fear and rejection to a more ameliorative attitude toward the employment of the emotionally handicapped and the mentally ill who are or who can be rehabilitated. Industrial physicians have a clear obligation to assume leadership roles in this great task.

Jobs Unhazardous

Occupational hazards will no longer be a consideration in determining acceptance of life insurance applicants by 1965, predicts the Institute of Life Insurance, New York. "The great improvement in industrial safety and preventive medicine have at this point almost removed occupations as the major factor in determining insurability."

Today, for example, only experimental jet pilots remain totally uninsurable as a group. Taken off the uninsurable list in recent years were steeple jacks, deep sea divers, airline pilots, and radium dial painters. Other occupations, formerly uninsurable, are now insurable but must pay higher than average premiums. These groups include: Drivers trucking nitroglycerine, chemical workers handling explosives, caisson workers, building wreckers, and military pilots.

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Some of the Problems of

Employment of the Cardiac in Industry

The physician, the employer, the labor union and the court are involved in this problem which is increasing in scope and complexity.

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Every thoughtful physician is concerned with problems of employment of the cardiac patient. He knows that after his patient's physical condition has responded to medical care, the problem is still unsolved. In fact, the medical phase of the cardiac may simply be the first part of the problem; the first being to restore the individual to maximum health, and second to reestablish him in successful employment when possible.

Current professional literature reflects the difficulties facing employment of the handicapped. It is commonly recognized that the cardiac of all handicapped groups is one of the most difficult to place.

The sheer size of the cardiac problem worker demands attention. Each year over three quarters of a million new cases of coronary thrombosis recover sufficiently to go back into industry. Add to this the facts that more people live longer, are more susceptible to degenerative diseases such as heart disease; that eight out of 10 males at age 40 have a clinically discernible degree of coronary disease; and that from personal experience I know 7% of men over 40 in a large industrial plant showed significant abnormalities on routine electrocardiograms. These facts indicate that the already large problem is steadily increasing, and that constructive steps must be taken promptly to avert even greater problems from developing. In order to make sensible suggestions about solutions, some of the factors should be analyzed.

The primary fact involved in employment of the cardiac is fear. The cardiac himself is fearful—fearful that activity will injure him or precipitate another attack. Careful, patient, and optimistic counseling can be allaying in many cases. Evidence shows about seven out of 10 persons (postcoronary) return to their previous jobs, regardless of the job held previously. A calm, sympathetic, and understanding citing of these figures, can assure the distraught patient that many years of employment are possible.

In some areas cardiacs themselves have banded together (usually under medical counsel) to help in indoctrinating others towards their disability. Coronary Club members, properly oriented through medical counsel, can help persons recovering from severe physical and emotional trauma of a heart attack.

Fears also beset industry. Industry is fearful about increased costs of workmen's compensation and fringe benefits involving health and hospitalization. They are concerned about production problems, and training and eventual promotion opportunities for the cardiac worker. Questions of absenteeism and safety are also to be considered. All these attitudes still exist, even though there is a growing body of data which completely invalidates many of these points.

Industry's fears cannot be brushed off, for these concepts, whether justified or not, act to deter employers from hiring the cardiacs.

Labor has its concerns. Their first is to assure their membership full-time employment under satisfactory working conditions at adequate pay. The general employment picture influences the union's reaction to the employment of the handicapped worker. When economic barometers are rising, more concessions are made to the handicapped. When the picture is darker, the cardiac worker has even greater handicaps to face.

Rigid caste distinction among unions serves as a handicap to proper placement of the handicapped worker. Seniority is one of the cornerstones of labor and strict adherence to this principle militates against successful placement of the handicapped worker, and particularly the cardiac worker.

Union attitudes towards handicapped workers must be evaluated against other developments. For example, union welfare plans must be considered. If a disabled or handicapped union worker cannot go back to work and his other benefits are exhausted, he frequently can draw from union welfare funds for help for some time. The addition of large numbers of handicapped workers to union rolls could aggravate this situation more.

A factor in employment of the handicapped individual with cardiac ailment involves workmen's compensation. Originally these laws were enacted to protect the employee and his family if the employee suffered death or disability while on the job. These laws were designed to mitigate the appalling industrial accident and death toll; they were, for the most part, liberally drafted and liberally interpreted. They unquestionably favored the employee. As long as compensation laws concerned themselves with true accidents only, there was no great problem. However, in recent years, these laws have been progressively enlarged and their interpretations have also been widened. Heart disease, particularly coronary disease (a process of degeneration), has been brought within the scope of this law. Some states rule that occurrence of a coronary thrombosis at work has a direct cause-and-effect relationship. Special groups, particularly firemen and policement have been provided for under the laws of some states. The laws in those states provide that any heart disease occurring in an individual belonging to such a specified group is automatically presumed to rise out of his employment and this is an automatic matter of compensability. However, these laws do not specifically state anything concerning heart disease aside from their application to these special groups. It is a matter of interpretation of the law by workmen's compensation boards. The tendency of these boards and the legislatures has been to favor the employee's position and, consequently, benefits and coverage are being extended to more and more individuals for more and more disabilities. Naturally, employees with heart disease are affected by this liberalized interpretation of the present workmen's compensation laws.

It would not be fair to leave this aspect of fear without mentioning concerns the physician has in advising the cardiac worker. Most of us recall that not too long ago prevailing medical opinion was that the cardiac patient should be cautioned about excessive work and concern. This prevailing medical concept, which dates back a decade or so, still affects today's medical thinking. Medicine's nature is to be skeptical and conservative, and this is both a bulwark and an obstacle. With the information at hand years ago, there was no logical course an ethical physician could take other than to recommend conservative treatment. The evidence shows cardiacs are more frequently benefited by working than by not working. I speak only of the physical aspects of the disease, and not of the social and humanitarian values accruing to the individual and his family when the worker is productively occupied. There is fear in the minds of some physicians about how much work a cardiac person can do safely. This is understandable, and in many cases limiting the patient's activities is the only safe path to be taken by the conscientious physician. But the time has come when all physicians should become aware of the recent statistical studies which reveal that in most cases the cardiac is better off when employed. This concept requires professional orientation, some soul searching, and a willingness to change deeply rooted beliefs. These comments do not in any way imply a criticism of individual physicians nor of the medical profession itself. I am suggesting that many cardiacs have an emotional make-up which renders them extremely susceptible to the opinions and attitudes of physicians. In such cases the physician should maintain a resolute air of optimism rationally based on reason. So many patients require continuing assurance that this is as much a part of the doctor's therapeutic agents as any modern drug. Many cardiacs would be benefited by a positive aggressive course of treatment, undergirded by a strong reassurance. The only way the physician can feel secure in this kind of a relationship is to be well grounded in the factual studies which demonstrate that the cardiac can and should work.

The physician's attitude towards workmen's compensation has always posed an interesting paradox to me, and here we see one reason why costs of workmen's compensation assume a central part in any evaluation of problems facing employment of the cardiac worker.

Each of us knows the physician who always testifies on the part of the plaintiff and his counterpart who always testifies for the defendant. Usually the facts in each case are clear and unequivocal so the explanation must be sought elsewhere. I do not think the wide variance of medical opinion based on uniform facts is a reflection of professional judgment. I am certain

physicians testify honestly as they view the problem.

It is interesting to speculate on the background factors of the physician to see what influence these factors could have on their thinking. Man views life through a pair of spectacles compounded of education, race, family life, etc., and our life experiences color our impression of the world around us. This does not mean we see things differently. So, I speculate, the physician who invariably supports industry does so out of a basic insecurity, and affiliates himself with the corporation to bolster his status or ego. It might also be that the physician for the plaintiff may abhor "big business" and thus link himself with the "little man."

Regardless of these thoughts, workmen's compensation cases become contests between medical adversaries, and colors are seen as either black or white. The old precept, "No evil man is as evil as you think, and no good man is as good as you think," applies here, for compensation cases by their very nature cannot be black or white. Yet our present system in most states places a premium on the contest principle, when many of us feel justice is better and more faithfully served through compromise than through the argumentative adversary type procedure now common.

May I give you a personal instance of professional dichotomy or professional schizophrenia, whichever phrase you prefer? I have been an active practitioner of medicine for more years than I would willingly wish to recall and I also have spent more than a decade as an industrial physician.

A patient comes in after his cardiac episode. He is doing fine. With reasonable professional assurance, I tell him that he can return to work, that his condition is physically excellent, that he will not precipitate an additional attack by working, and there is no reason I know why he cannot lead a fairly normal life for years to come.

Now, the schizophrenia part comes in to play. He comes in to me for a physical because he wants to work for a company I represent as an industrial physician. If he is perfectly frank to me in his statement of his condition, and after I have made a thorough physical examination, I will have to tell this man that our company medical policy (as interpreted by me) prohibits his employment with our firm.

Now, does this make sense? Obviously it doesn't, for the problem remains the same; the difference being the fact that I am viewing this person from two different perspectives. First, I see him as my patient, and I can conscientiously recommend him for a job. Second, I put another cap on and tell him I can do nothing for him as the industrial physician representing the concern where he seeks employment. That problem is more common than supposed, and I am sure that many of you have had the same unhappy experience that I have in trying to reconcile these two incompatible and seemingly irreconcilable points of view.

A classic study on the attitudes of physicians on this matter was carried out by Ehrlich[1] who queried internists and cardiologists. His findings, based on a questionnaire to hundreds of physicians, resulted in these conclusions:

1. Work does not produce heart disease (vote 94% to 1.5%).

2. Coronary arteriosclerosis or some form of coronary disease must have pre-existed in an individual who suffers a coronary occlusion and myocardial infarction (vote 93.4% to 6.3%).

3. Performance of the same type of moderately heavy work without engaging in unusual exertion or strain has no injurious effect upon the heart. A myocardial infarction occurring during such work is not causally related to employment (vote 88.6% to 7.1%).

4. Subsequent attacks of myocardial infarction are not causally related to the first attack but to the underlying pathology of the coronary vessels of the heart (vote 82.8% to 12.9%).

5. Opinion of the effect of a strenuous physical exertion or emotional disturbance upon the heart was divided; 46.6% considered that there was a causal relationship between strenuous work and ensuing myocardial infarction, and 49.5% did not believe so. Emotional factors were considered slightly more important than physical factors.

6. Opinion was divided on whether a person has a permanent partial disability after he has recovered from his myocardial infarction and returned to work asymptomatic; 45.8% felt there was a disability and 47.9% that there was not.

It has been commonly assumed by those who want to place the cardiac in industry that compensation costs when involved are minor. This is not true. For example, in New York state in 1949, workmen's compensation cases in cardiacs were only .18% of the total but the cost of those cases was 2.5%. Cardiac cases averaged $9,400, and this should remove any question about the economic importance of compensation for the cardiac.

Let us return for a moment to some of the managerial problems above and beyond the aspect of workmen's compensation. Employee training is almost essential in nearly every kind of business, and training is an expensive procedure. Therefore, industry is careful about those whom it selects, and it is probable that

managers are not going to select for long and costly training courses those individuals who could be expected to have a shortened work and life expectancy. This attitude, verbalized or not, must have some effect upon training opportunities for postcoronary persons.

Industry has still another practical problem. Many concerns do not have the diversity of jobs which would make it possible to incorporate a cardiac successfully into the plant's activities. A very high proportion of the American work force is employed in plants with less than 100 workers, figures from large national corporations not withstanding, and these smaller plants are not able to readjust work schedules and responsibilities for the cardiac. It is true that in larger plants it is possible to reserve a certain number of jobs with union sanction to which the handicapped worker can be successfully assigned. This still is the exception rather than the rule, and even many very respectably sized plants have not reached this step of maturity. This is one area which deserves the most careful and critical scrutiny, and it may be that when additional evidence is obtained, it might conceivably point to the smaller plant as being more adaptable rather than to the large plant.

Unions have their problems too. Many unions operate under the union hiring hall which assigns individuals to jobs on a rotation basis, and the man's disability is of no consequence if he is able to show up for work. It is an either/or proposition, and this poses two grave problems. The first, and most important, is that such job assignments might be unfair to the individual himself; it is possible that the kind of work he accepts could precipitate additional disability or even death. The union cannot avoid its responsibility in this respect.

The second union problem is that one of the cornerstones of modern unionism is the system of seniority, and moving and assigning men on the basis of physical abilities and disabilities rather than seniority is not only a complex but a well nigh impossible thing to do. Seniority propels individuals from the more difficult and exhausting jobs to those less taxing, and the more seniority the worker has, the less difficult physically his job usually becomes. The union's attitude has been that it is unfair to allow the disabled person to circumvent the seniority system, regardless of how meritorious the individual may be.

Still another union situation which affects the employment of the handicapped worker is the caste system which rigidly separates the crafts. For a simple example, let us take a bricklayer. The only thing he can do under union rules is to lay bricks—he does this or nothing. It is also possible that his cardiac condition prohibits this kind of manual labor. Can he then shift to some analogous job with less physical strain and effort? The answer is no, for he must start at the beginning as do all craftsmen learning a trade and go through the apprenticeship phase first. In industries where there is the horizontal rather than the vertical union structure there probably is less difficulty in shifting from one kind of a job to another, but even in those cases there is the problem of plant seniority, geography, etc. All these circumstances operate against the individual.

The industrial physician is also in a quandary. As a physician, he is well aware of the social and personal values of employment of the cardiac worker; as an industrial physician, he is all too well aware that cardiac cases do increase workmen's compensation costs, and torn between these two points of view, he frequently takes the employer's part and tells the cardiac that he is not employable by this particular concern. If the physician is absolutely sure that death or disability would not ensue, this would be a different proposition, but how many of us have this kind of faith in our diagnostic skills?

If physicians are to be of more service to their cardiac patients, they should seek to know more of the work requirements of different jobs in industry. The more actual knowledge the physician is able to accumulate the better placement he is able to make, the more satisfied industry will be with these placements, and the more opportunities there will be for more cardiacs to be accepted.

Even though the plight of the cardiac worker poses major medical and industrial problems, changes can be made which will make it easier to employ the worker who has had a heart attack. Current interpretation of workmen's compensation laws needs careful re-examination, because heart disease should not be measured by the same standards applied to other disabilities. The basic distinction which makes heart disease unique is that it is a degenerative disease which begins early in life and progresses inexorably with aging. To classify heart disease in the same category as a broken leg, an injured back, or a lost finger is doing violence to logic. It seems that a new look should be taken at the interpretations of workmen's compensation as they affect heart disease.

In a number of progressive states attempts have been made to lighten the workmen's compensation load the employers carry. A "second injury" law has been promulgated in Minnesota with several important provisions. First, to be eligible for coverage the employer must list the physical and mental defects of the employees.

Second, if the employee with a pre-existing disability has an accident, the employer may apply for reimbursement for the increased costs incurred. Third, in no event will the employer be liable for more than 104 weeks of compensation plus the medical costs. The second injury fund will be responsible for expenditures beyond those cited. This law has been held out as one which would encourage the employment of the cardiac worker, but so far this has not occurred. It is my opinion that as presently interpreted and administered the law is relatively ineffectual in realizing its main objective. However, the basic concept is commendable and it is possible that eventually the law will be refined to the point where it will be constructive as originally intended.

From a medical standpoint, the second injury legislation is not adequate for the cardiac. The Ehrlich poll revealed that physicians generally felt that coronary thrombosis does not occur as a first injury but rather as a second injury and consequently should always be listed as eligible under the second injury fund. The present law requires that the employer list an individual's defects prior to the incident requiring compensation, and if an employer is going to respond honestly, he will have to state that *all* his employees have heart disease — in 85% of the cases he will be absolutely correct. Such action is farcical, and the only proper step should be to amend the law so that all cardiac disease is properly listed as a second injury and not as a first injury. Although this appropriate step would help the employer somewhat, it would not eliminate his responsibility for the first 104 weeks and the medical expenses and hospital expenses. This can be an expensive package for many cardiac cases can easily cost around $10,000.

There is a possible solution to this dilemma. It is obvious to me that coronary thrombosis at no time is entirely due to an individual's employment, and neither do I believe coronary insufficiency resulting in death is entirely due to the work done at the moment. These individuals have already had the disease to some degree, and an incident occurs to accelerate or aggravate the existing condition. Therefore there are degrees to be considered in these cases. If a man develops coronary insufficiency because of hard work and dies, this cannot and should not be ascribed to the work he was doing. The difficulties he underwent were based on existing coronary disease and the consequential narrowing of the arteries which also was pre-existing.

It would seem more rational and equitable to allocate a definite percentage (10, 20, 30, 40 or even 50%) of a man's death to the effort expended at the time, and the remainder ascribed to existing heart disease. This would give as a better and more honest measure that we are using at this time.

Another useful step towards improving the effect of workmen's compensation upon industry and the worker is to approach the problem of medical testimony in a different way. Too frequently now medical testimony becomes disputatious and argumentative. It becomes a contest between physicians and this is no help to the cause of medicine nor the individuals involved.

Certain physicians always represent one side; others the opposing group. In Utah these cases are judged by a medical panel of cardiologists selected on a rotating basis by the medical society. The panel hears the evidence, evaluates the facts objectively, and then renders a decision. Although the workmen's compensation commission or court is under no compulsion of any kind to accept the medical panel's decision, as a matter of record they have always abided by the results. I think one of the keys to the Utah success is that the men chosen are of unimpeachable integrity and that they are more disposed to find similarities rather than differences, and compromises rather than conflicts. The individual whose case is being decided may also appeal the verdict if he so desires, but in the extremely rare instances when this has occurred, the medical panel's judgment was upheld.

Still a third suggestion for improving this situation regarding employment of the cardiac worker involves the work classification unit. There are about 50 now operating throughout the country and their staffs traditionally include the physician, a medical social worker, a vocational counsellor, occasionally a psychologist, and infrequently a psychiatrist. The work classification unit does not diagnose or treat heart disease; it is a professional service made available to the physician to help him place his cardiac patients on jobs where they will not injure themselves or others. One remarkable result of these units is that a thorough follow-up study of 2,000 clients in two major centers (Cleveland and New York) revealed that not one single claim arising out of workmen's compensation came from this entire group.

In March of 1959 the Minnesota Heart Association with the indorsement of the Minnesota State Medical Association opened a work classification unit in Minneapolis. Like all other units, it accepts referrals only from physicians, and to date, 16 months later, 268 individuals have been processed. Based on this limited experience our tentative conclusions are that the work classification unit fills an important community need, that it is a valuable adjunct to the practicing physician in his work with heart patients,

and, most important of all, that it can materially assist the individual in proper job placement.

It would be unrealistic to suppose that a work classification unit can alone solve all the problems of cardiac employment. The industrial physician should become better informed about the requirements of the positions in his industry so he may adequately fit the individual to the job. For example, the use of the word "light work" is often a misnomer, because the term has so many connotations. We need to explore this more explicitly. Union rules must be relaxed as far as seniority rights are concerned, and I am sure leaders of the unions realize this. They realize they have a great stake in this problem, both from the point of trying to do the right thing by the individual, and from the financial point of their own welfare fund being greatly taxed if these individuals are not put back to work in an industry. Last of all, members of the medical profession must support such a program in order to make it work. It becomes necessary that we, as physicians, do our best to support some changes in the compensation law, that we assist in changes concerning medical testimony, that we assist in the work of a cardiac evaluation clinic, and try to help industry and labor make a better selection and placement of these individuals.

Summary

1. Employment of the cardiac is a major problem today and is increasing in importance.

2. Much of the difficulty comes from fear on the part of the employee, the labor unions, and industry.

3. Excessively liberal interpretation of workmen's compensation laws is a major factor in employment of the cardiac patient.

4. The individual physician's role in workmen's compensation has a most important bearing on the "contest" philosophy presently obtained in these cases.

5. Questionnaires and documented findings show that the cardiac patient can take his place in industry.

6. Workmen's compensation cases involving cardiac patients comprise a proportionately large percentage of the total costs of workmen's compensation.

7. Both industry and labor have unique problems associated with employment of the cardiac and education is needed to change some of the current attitudes which hinder the cardiac from employment.

8. Changes in workmen's compensation laws are urgently needed.

9. Work classification units should be encouraged and supported by physicians.

10. The physician's attitude, interest, and approach toward the individual involved in employment is still the primary determining factor and his increased knowledge and perception of the complex facets of the problem is the eventual key.

11. The Utah plan for establishing a panel of specialists to review cardiac cases appears to have merit and should be considered for more general use.

Reference

1. EHRLICH, H. R.: The Cardiac Problem Under Workmen's Compensation Law. *New York J. Med.*, 57:1466, 1957.

Waterborne Disease Drastically Cut

Early in the 1900's medical research and engineering developments, particularly the use of chlorine as a water disinfectant, led to the widespread introduction of water purification systems and construction of waterworks. At the same time, growing awareness of the need for protecting the public health through control of pollution brought about construction of sewage collection and treatment systems throughout the country.

As a result of these various measures, death rates from waterborne disease began to decline, until today many of these diseases have all but disappeared. Fifty years ago the typhoid fever rate was 22.5 for every 100,000 people. Today it is less than 0.05. If the earlier rate had prevailed, some 42,000 people would have died in 1958 as compared with the 20 typhoid deaths actually recorded. Infant mortality, much of it resulting from waterborne gastroenteric infections, has been cut at least 75% in the last half century.

—*Bulletin* of the National Conference on Water Pollution, U. S. Public Health Service, Sept. 2, 1960.

• O. L. HANSON, M.D.
Chief of Medicine
Atcheson, Topeka and Santa Fe Hospital
Topeka, Kansas

THE 4 WAY TEST

Although the four-way test is not uniquely a medical test, benefit may be derived from its use in the daily practice of medicine. It is a test first devised by a Chicago businessman to save a faltering company. Its successful use was impressive. That businessman later became a president of the organization Rotary International which has adopted the test as a guide to conduct and is active in encouraging its world wide use. The test is this, to subject whatever you say, think, or do to these questions:

1. Is it the truth?
2. Is it fair to all concerned?
3. Will it build good will and better friendship?
4. Will it be beneficial to all concerned?

It is clear that if these questions are used systematically, they do form a guide to conduct, a system of thought and action. Scientists are fundamentally systematic, or they soon learn to become so, and physicians have had such a system for over 2,000 years in the great Oath of Hippocrates. Let us examine these four questions together in an attempt to learn whether physicians are interested in their answers.

First, is it the truth? Physicians are certainly interested in the truth of statements made to them or by them. Being scientists, we ask this question not in jest, but in earnest; and we are willing to search diligently for the answer. We are aware that truth may not be found easily. Since it is impossible for any one of us to examine all of the evidence for and against our beliefs, we use one or more of several ways of knowing about them. Such ways, listed more or less according to their reliability, are: (1) appeal to custom or tradition, (2) appeal to authority, (3) personal experience, (4) logic, and (5) scientific inquiry.

Let us examine how we, as physicians, use these ways of knowing.

1. Custom or tradition. As a general rule, when physicians use custom or tradition as a reason for statement or action, it is because we don't know a better reason. For example, we treat a common cold symptomatically, whether by the use of aspirin, antihistamines or alcohol, because we do not know a better treatment. Only a few years ago we treated many infectious diseases symptomatically for the some reason. Some of these diseases are now customarily treated with chemotherapy or with antibiotics, not because of custom or tradition but because of another way of knowing, that of scientific inquiry. There is another reason for behavior based on custom or tradition besides lack of knowledge. We sometimes do so because we wish to follow the crowd or be a part of the crowd. This, however, may not occur as frequently in scientific circles as in some other areas of conduct.

2. Appeal to authority. Another evidence for truth of statement or action is that coming from authority. Not only do methods of choosing authority differ, but authorities themselves often differ. We occasionally see a patient whose authority on medical matters is quite different from our own. For example, the patient's authority may be the grandmother of his next door neighbor. However, our own authorities differ. I may base the dietary management of a patient with coronary heart disease on the statements of one authority whereas you might prescribe a far different diet because of a different author-

Delivered at the 35th Anniversary Congress of the Pan American Medical Association in Mexico City, May 2-11, 1960.

ity. Thus we learn that our beliefs in authority are really based on faith. They are faith beliefs and may not be truth beliefs.

3. Personal experience. We all base some of our statements and actions on our own experience. That we are aware of the unreliability of this as evidence for truth is made evident by our joking about the physician who makes sweeping decisions from his series of one case. Prejudice often colors our observations and even our awareness of experience, and it is common knowledge that we are only one in many millions. Sometimes, however, a personal experience coupled with inspiration or revelation contributes a great deal to our knowledge. The personal experience of Sir Alexander Fleming when he observed that bacteria surrounding a growth of fungus were kilied, and the experience of Pasteur when he found that aged cultures of the germ which causes chicken cholera failed to produce a fatal disease, are only two of many such personal experiences, which, coupled with inspiration and developed by scientific methods, led to great knowledge.

4. Logic. The fourth source of evidence is logic. By the use of this process we attain proof of statement from one or more other statements by reasoning. We could say that since venous thrombosis may produce an embolus, and an embolus may cause pulmonary infarction, then it is logical to believe that a patient with pulmonary infarction could have a venous thrombosis. This is an important way of knowing, but as physicians we are particularly interested in the fifth method, scientific inquiry.

5. Scientific inquiry. This involves the use of a scientific method, that of developing a hypothesis, collecting facts, testing that hypothesis and determining its validity, and then using the hypothesis as a guide to further observation. However, we must remember that scientific truths are really probabilities. Physical truths are those phenomena whose measurements or actions fall within a certain range of probability or predictability. Biological truths usually have a greater range, but that which has a high degree of probability or of predictability we accept as satisfactory evidence.

Is it fair to all concerned? We are certainly interested in the answer to this question. Nor do we ask this question to justify condemnation or punishment. Physicians must ask this question with the desire to understand and through that understanding, to help. Obviously we cannot answer this question unless we determine the relationships involved: the relationship between the patient and his family, between the patient and his job, between the patient and his community. The welfare of the individual patient depends upon these relationships just as the welfare of society depends upon the individual. The effect of a patient's disease on others is often a delicate subject but it can only be solved by understanding by physician and his ability to convey that understanding to others.

Fitting is the story from Jacob Sarnoff's book *Better Health, Longer Life.* A couple walked into an orthopedic surgeon's office, the wife being four inches taller than the husband. She asked if her husband could be made four inches taller. "Yes," answered the surgeon. "It would take about a year to lengthen both legs, and would require about four separate operations." "Oh, that's wonderful," she exclaimed. "My dear lady," he replied, "I only said that it could be done. It would be much easier and safer to have your legs shortened to your husband's height." Whereupon the lady exclaimed, "That's not fair," and dragged her husband from the office.

The third question is, will it build good will and better friendship? One of the prime forces that influence human behavior is the desire for security. It is not likely that any one of us could exist satisfactorily all alone. We are gregarious creatures and we depend upon others. Our security is in danger if we do not have their good will and friendship. The often discussed patient-doctor relationship works both ways. The doctor is helped as well as the patient.

The fourth question is, will it be beneficial to all concerned? This involves what we, as individuals, believe is good or bad, and this depends upon the particular human value system into which we have grown. Each one of us has been guided into such a system by our parents, our teachers, and our religion. It is well for us to remember that our value system changes as we gain in knowledge and experience, as we gain in wisdom. When we recognize the changeability and variability of our own value system, we learn to be more tolerant and to have a better understanding of the value system of others.

It is clear that the use of this test does not produce detailed or rigid answers. However, it does help to produce an attitude, an attitude of an open mind searching for truth which favorably influences judgment.

Our patients require this of us. The systematic use of the four-way test may help us to develop an open mind searching for truth and understanding, thus helping to justify patient's faith in our authority.

Letters

To the Editor:

Our Committee on Organic Solvent Poisoning, founded in 1959 to promote studies on solvent poisoning, is desirous of exchanging literature on such poisoning.

We would greatly appreciate reprints of your papers on the poisoning due to organic solvents such as benzol, trichlorethylene, etc. if you have any copies available for distribution.

We wish to thank you for your favor,

—H. MURAKAMI

Secretary of Committee of Organic Solvent Poisoning, Japanese Society of Industrial Medicine

Address: Dept. of Public Health, Faculty of Medicine, Kyoto University, Kyoto, Japan

To the Editor:

In October, 1958, the International Labour Office convened a group of experts on pneumoconiosis to meet in Geneva. The object of the meeting was to study the results of the application of the International Radiological Classification of the Pneumoconioses proposed at Sydney, in 1950, by the Third International Conference of Experts on Pneumoconiosis, and to make any modifications to the Sydney classification considered necessary in the light of experience since that time.

For the purpose of brevity in reference and in order to distinguish this classification from others, it might be referred to as the "Geneva Classification (1958)."

In view of the inadequacies of verbal description, the experts recommended the preparation of a series of standard films illustrating the essential features of the classification. They had been impressed with the fidelity of reproductions of x-ray films made by new techniques and decided that the set of standard films would consist of such reproductions. A working group consisting of Dr. Cochrane, Dr. McLaughlin and Dr. van Mechelen was appointed to select the standard films. This group has now finished its work and the set of radiographs will soon be available. While a number of difficulties was encountered by the working group in completing this task, it is believed that the results mark an important step towards the goal of a generally acceptable classification of the radiological appearances of the lungs in pneumoconiosis. The observations of the users of the classification will be studied with care and interest.

The price of the complete set of standard films consisting of 14 radiographs of 14 x 14" (35 x 35 cm) format will be 20 U. S. dollars (or the equivalent in other currencies), postage, insurance and packing included. If your readers would like to obtain a set of films, they are invited to notify the Occupational Safety and Health Division, International Labour Office, Geneva, Switzerland. They will be notified as soon as the sets are ready and information will be given regarding the method of payment.

—DR. ROBERT MURRAY

Occupational Safety and Health Division
International Labour Office
Geneva, Switzerland

To The Editor:

The article, "Hazards of Microwave Radiations, A Review," by Dr. Kuo-Chiew Quan, in Vol. 29, No. 7, is well done. Only two statements have been included which, if acted upon, may cause someone trouble. The first is, "People who work in the vicinity of radar equipment can be supplied with photographic flash bulbs to warn them when they are exposed to intense microwave fields." Photoflash bulbs fire at widely different field strengths and only once, of course. General Electric Type NE-2 neon lamps, when connected, in a resonant loop, light at a field strength below the continuous allowable exposure limit, 0.01 watt per sq. cm. at frequencies below 1,000 mc., and when used with its leads clipped close to the seal, light at field strengths of less than 10 times the continuous allowable exposure limit at 3,000 mc. These give a continuing warning as long as the microwave field is present, and survive large overloads.

The second is, "Such vulnerable organs as the testes and eyes can be protected by close-fitting metallic screens." Close-fitting metallic screens must be applied to protecting parts of the body with great caution, because what may seem a slight misadjustment can result in subjecting the member of the body to a stronger field than it would receive without the screen.

Early tests on protective clothing demonstrated the above dramatically when sparks jumped from the metallic rims of a testman's glasses to the inside of the head shield. The coupling into the suit was believed to be where the suit fit over the wearer's shoes.

I, too, trust the use of microwave energy will be accomplished by appropriate respect and precautions.

—HARRY H. MEAHL

High Frequency Measurements Engineer
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Abstracts

The Attitude of Industrial Employers Toward Hiring of Former State Mental Hospital Patients

VYTAUTAS J. BIELIAUSKAS and HARVEY E. WOLFE. *J. Clin. Psychol. 16*:256 (July) 1960.

The purpose of this study was to determine the attitude of employers toward hiring former patients of state mental hospitals. Conducted in Cincinnati, Ohio, it covered all manufacturing firms employing 100 or more persons, of which there were 251 firms in that area. The findings were evaluated in terms of percentages and chi-squares. An attempt was also made to compare the size of the firms with the attitude expressed.

Eight percent of the employers were completely opposed to hiring former patients; 16% showed some hesitation; 32% were slightly interested; 37% were interested; and 5% expressed enthusiasm. Replies were not elicited from 2% of the firms that were planning to leave the area.

Science Miniature

Helicopter Flicker Disease A New Occupational Disease

CAREY P. MCCORD, M.D.

For a long time it has been known that various flicker devices somewhat widely in use in medicine could induce convulsive states after exposure by susceptible persons. Likewise such flicker devices have served to induce hypnosis.

Somewhat unexpectedly a few persons exposed to the flicker effect brought about by motion of helicopter blades have developed convulsive states. Berry and Eastwood (Helicopter Problems, *Aerospace Medicine*, March, 1960) have appraised the over-all situation and reported two new cases of flicker vertigo. One was a B-36 aircraft tail gunner who, while scanning the engines, elapsed into unconsciousness. His last memory was viewing the sun through the slowly turning propeller blades. He was described as having a grand mal convulsion in the aircraft although he had never previously had a seizure. The second case related to a pilot serving as airdrome officer upon meeting an incoming C-54. While awaiting the engine to shutdown, he viewed the rays of the setting sun through the revolving propellers. Promptly he developed a grand mal seizure at his post of observation. In these two instances it proved possible to reproduce these seizures under experiments by photic stimulation at measured rates of flickering. It becomes possible that passengers who are subject to seizures may be excited into such states upon viewing slowly rotating blades of aircraft. This occurrence in passengers ordinarily would lead to no implication as to occupational origin, but in the two instances cited it becomes manifest that they constitute an occupational affection. Precisely speaking, with due consideration for the duration of the exciting exposure, these events should be categorized as accidents. However, if more such happenings come about the disposition likely will be to regard these conditions as constituting an occupational disease. Whether there had been previous seizures will become a significant consideration in the proper categorization of these episodes.

Books

The Heart In Industry

Edited by Leon J. Warshaw, M.D. $7.50. Pp. 677. Paul B. Hoeber, Inc., New York, 1960.

Written for both the industrial physician and the private practitioner, this volume considers heart disease from three interrelated points of view: the effect of heart disease on the patient and his ability to continue work; effects of the patient's work on the course of his heart disease; and the problems the cardiac worker presents to his employer.

The text provides detailed answers to those problems most frequently encountered in practice: the identification of the individual with heart disease, the evaluation of his functional capacity, the technique of selective placement, and the prevention of cardiac disability.

For the physician in private practice, it furthers an understanding of the effects of work on the heart, the cardiac effects on such occupational activities as vehicle operation, aviation, and farming, and the vocational rehabilitation of cardiacs.

An entire chapter is devoted to those agents — chemical, biological, and physical — associated with cardiovascular toxicity. Another chapter discusses the highly controversial subject of workmen's compensation. The factors that distinguish cardiac compensation cases from those that are noncompensable are outlined fully as well as the various problems relating to causal relationship and compensation litigation.

The Heart In Industry is written by clinicians for clinicians, and because of this eminently practical approach, it is bound to be a valuable ready-reference in the everyday practice of all those who treat the cardiac worker.

Metal-Binding In Medicine

Proceedings of a Symposium. Edited by Marvin J. Seven and L. Audrey Johnson. $13.75. Pp. 400. J. B. Lippincott Company, Philadelphia, 1960.

Editors Seven and Johnson have provided us with the proceedings of a symposium on chelation and metal-binding sponsored by the Hahnemann Medical College and Hospital in Philadelphia in May, 1959. They describe this volume as "a collection of formal papers and panel discussions . . . long overdue," designed "to bring together clinicians and research workers in the trace metal field."

Over 60 impressive contributors have discussed the basic concepts of trace metal research, chelation, the past experiences with the clinical applications of many metal-binding agents and, finally, not only have presented a survey of the current diagnostic and therapeutic utility of these agents, but also have explored the potential clinical usefulness of the metal-binding principle.

Because the designers of the conference and the editors have striven for an organized, comprehensive agglutination of principles and data, this book serves as a ready reference for review of metal-binding principles, trace metal data, and pertinent bibliography.

—VERNON N. DODSON, M.D.

The Health of People Who Work

Edited by Albert Q. Maisel. $4.50. Pp. 268. The National Health Council, New York, 1960.

The scientific papers basic to this book were published as a special issue of this journal (July, 1959). This book is a far better presentation of what took place at the 1959 National Health Forum in Chicago than the mere assembly of a numerous lot of manuscripts. The book's editor has an achievement possibly unique and certainly admirable. Instead of the cold assembly of the Forum's papers into a book, he has digested all, dug out the pertinencies, eliminated the extraneous but at the same time has preserved identity with the scores of forum speakers. Many another reporter has yearned for the courage and boldness to do just what has been done. The hope is that this publication may set a precedent that will be imitated not once but many times.

Some of the driest, most feckless reading in the world of public health is to be found in proceedings that are nothing more than faithful recording of stenographic reporters. All that has been abandoned in this report. Glory be!

The products of this digestion are arranged in these subdivisions:

The Goals of Occupational Health Programs, Are Occupational Health Programs Worthwhile? The Special Problems of the Smaller Plant, Occupational Health and the Living Environment, The Placement of Workers in Relation to Their Physical and Mental Capacities, The Role of Occupational Health Programs with Respect to the Emotional Problems of Workers, Health Education in the Occupational Setting, Preparing the Worker for Retirement, Finding Manpower and Cooperation for the Occupational Health Program, Occupational Medicine's Relation to Health Insurance and Other Fringe Benefit Programs, and Earning Support for the Occupational Health Program.

The reasons for this particular National Health Forum are well set forth in this language now quoted:

"Upon the well-being and productivity of almost 70 million workers both our national economy and security depend. Maintaining and improving the health of the working force constitute, therefore, a high priority for the nation.

"Although many large industrial firms have long recognized the importance of their employees' health, most small and medium-sized companies which employ approximately two thirds of our total labor force have failed to harvest for themselves, and the nation, the multiple gains of maintaining and improving the health of their employees through sound industrial health programs.

"Considering that in 1958 four million of the 4,300,000 businesses in the United States were small businesses, employing fewer than 500 persons, it is understandable that the principal target for information about the practical values of occupational health programs has been identified as business management—especially in the small plant.

"Leaders in management—in large and small business—have a responsibility to the nation, to each other, the community and the individual worker. Management has never intentionally neglected its responsibility."

This is no text book on occupational health. That was never its intent. There is a sufficiency of such texts. Instead this is a portrait in high color of the status of occupational health as it existed in 1959. But its value is not dated to the year 1959. It is a blueprint for occupational health activities for 1960 and many years to come.

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VOLUME XXIX

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Industrial Medicine and The Private Practitioner

Last year *(Penn. Med. J.*, 62:689, May, 1959) William P. Shepard, M.D., published a striking article entitled "The Importance of the Private Practitioner to Industrial Medicine." Without changing a word that same article, without becoming a paradox, might have been captioned in reverse. That interchangeability well serves the obvious kinship between these two forms of medical practice. Between the two are many interchangeable parts. Yet there are divergencies. One of the manifest ones is the difference in their respective "settings." Dr. Shepard is at his best in depicting these distinctions in his own language:

"There are probably 20,000 physicians now devoting part-time service to industry. Many are quite satisfactory, others give it a minimum of their time and try to do the job from their office without going near the factory. Although many of the teachers of industrial medicine and the specialists in this field will disagree with this statement, it is my opinion that almost any well-trained physician who is willing can develop considerable competence in this field. With industrial medicine a slowly but surely burgeoning specialty, there are now available in almost all parts of the country competent specialists who may be called into the small industry to help out with special problems. In fact, industry is more accustomed to calling in specialist advisers than is the individual private patient. With such help at his elbow, the part-time nonspecialist in industry can deal with the majority of medical problems which he will encounter in the industry he serves.

"The physician is molded in the hierarchy of academic college, medical school, laboratory and hospital. Over the centuries this ancient and honored hierarchy has given the public dedicated doctors, better prevention and treatment of illness and injury, and longer, healthier life. But it is a rigid hierarchy, one which shapes character. For the physician it tends to become a way of life, often the only one he fully understands.

"When the physician enters the portals of industry, he encounters a different but equally rigid hierarchy. There is the same systematic layering of personnel according to rank and degree of responsibility to which he is accustomed in the teaching hospital; the same clearly defined chain of command; not a dissimilar system of supervised tutelage with apprentices instead of interns and residents.

"But the physician's place in the industrial system is quite different from that to which he has become accustomed. He is not top man as he is in the hospital or his private office. His services are strictly secondary to the main purpose of the business — production at a profit. His value depends on his willingness and ability to work with others to achieve that main purpose. In industry he cannot give orders to all about him and expect them to be carried out promptly and meticulously. His word is not invariably taken as law. Administratively, he must prove the value of his recommendations, their reasons, probable results and costs. The physician will be happy in industry only if he can find satisfaction in being part of a nonmedical team and can work in harmony with the members of this team, understanding why he must do things in a certain way. In short, industrial health work demands things from the physician which may not be required of him in other fields."

If the private practitioner may come to grasp the unique "setting" of the industrial physician, he will by that acquisition come to know of his continual and continuing dependency upon the private practitioner. Through that same process will come the knowledge that the industrial physician has much to share with the private practitioner. The industrial physician knows industry and the private practitioner needs to know industry. Each man can become an added right arm to the other. The ultimate objective remains the same and that, as Shepard states, is:

"Above all, both management and labor have a right to expect the physician to be a neutral mediator in questions involving health. He must be fair to both sides, using his influence to help the injured workman obtain the benefits to which he is entitled, but also to protect the employer against unjustified claims."

He Who Gets Squiffed

No one with regularity may anticipate just what published in any periodical will prove to spark the widest reader appeal. A few years ago this journal, and a little bawdily so, published a score or more of those terms that through the years have designated the prostitute. That came as a natural to a journal dedicated to occupational health, since that profession may be the world's second oldest, and at any time in history the pliers of that trade constituted no mean company. Regrettable to relate, that mildly seamy item attracted more readers and more reprintings than a dozen starkly scientific presentations.

In like manner, alcoholism long has been a major headache for industrial physicians. For reason unknown, more terms have been applied in description of alcoholic intoxication than for any other human state.

Here are just a few: alkied, basted, behind the cork, blotto, bottled, bunned, corked, corned, cronk, embalmed, fisheyed, fogmatic, fried, fuzzled, geezed, glued, guzzled, hammered, have a package on, have a snoot full, high as a kite, hipped, jugged, juiced up, lathered, liquored, loaded, looped, lubricated, lushed, mokus, mulled, oiled, on the sauce, ossified, owly-eyed, packaged, pickled, piffed, pifficated, plastered, polluted, potted, pruned, raunchy, salted down, scraunched, scronched, shellacked, shikkered, shined, slugged, smoked, snozzled, soshed, sozzled, spiffed, stitched, striped, swacked, swazzled, tangle-footed, tanked, vulcanized, woofled, zig-zag. There are 200 more.

Under any name and with prejudice for none, ethyl alcohol, the world's "happy water," goes right along exercising the same gentle authority.

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BRAND OF PROPANTHELINE BROMIDE WITH PHENOBARBITAL
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Probital provides rational, convenient therapy in smooth-muscle spasm: spasm of the pylorus, small and large intestines and the sphincter of Oddi, as well as gastritis, biliary dyskinesia and diverticulitis.
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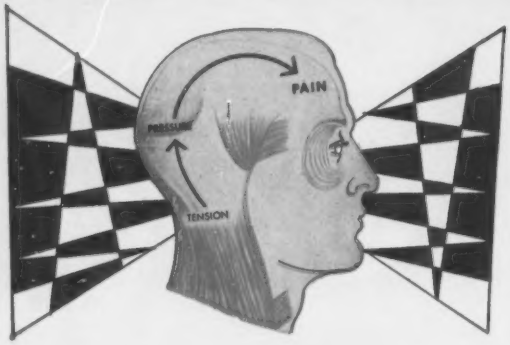

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ANALGESIC TABLETS

For a better 'total' effect in pain-relief

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COMMENT AND OPINION

Accident Record

Last year about 11,000 American women at ages 15 to 64 years were killed in accidents, it is reported by statisticians of the Metropolitan Life Insurance Company. Among women at these ages, accidents take twice as many lives as pneumonia and nearly five times as many as tuberculosis. During adolescence and early adult life, accidents outrank every other cause of death among women.

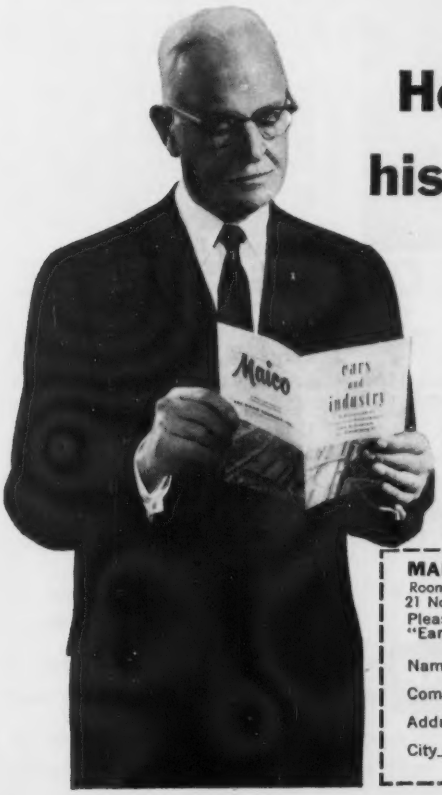
Motor vehicle accident fatalities far outnumber those sustained in any other type of mishap. and account for three fifths of all fatal injuries among white women at ages 15-64 and nearly half the total among colored women.

Falls rank second, and fires and explosions third as causes of accidental death. Only one fifth of all fatal injuries among women at ages 15-64 occur in and about the home. Even more surprising, fewer than 50 accidental deaths a year occur among women in industrial places, despite the millions of women gainfully employed in the United States.

New Federal Agency

The strengthening of the Public Health Service's nationwide program to protect the health of American workers through the creation of a new Division of Occupational Health has been announced by the Surgeon General.

The new Division, which replaces the Occupational Health Program, follows the recommendation of the Study Group on Mission and Organization of the Public Health Service, designed to place greater emphasis on all types of environmental health hazards. It provides for "long-needed increased efforts" in the occupational health field as recommended to the Surgeon General by the Study Group. Dr. Harold J. Magnuson has been named Chief of the new Division.



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That's the average benefit payable to workmen for occupational hearing losses. You can protect your company from losses like these by setting up a hearing test program. Let us tell you how. Send for Free MAICO booklet, "Ears and Industry".

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Medical Director: Diplomate, Prev Med, (cert'd, Occupl); Doctor of Indus Med degree, Univ of Cincinnati; 10 yrs, Indus Med; seeks challng post, Calif, NY, Wash, New Eng, No. Carolina.

Medical Director: M.D., Yale Med Schl; 3 yrs, Sr. Asst Surg, Publ Hlth; 5 yrs, Med Dir, lge automotive div; seeks Med Dirshp; west or East coast; age 36.

Medical Director: M.D., Univ of Wisc; 8 yrs, med dir & consultant, lge nationally-known co; Also, Clinical Instructor, Indus Med, & Lecturer Occupl Hlth, univ med schl; seeks Med Dirshp, lge institution, MW, NE or East.

Medical Director: 39; will take Occupl Hlth Bds; 13 yrs exper, Med Dir, heavy indus & insur; seeks New Engl area; military service completed.

Medical Director: Cert'd Prev Med; 7 yrs, group & priv pract; 2 yrs, plant phys to Phys-In-Chge, lge important chem co; also, Instructor, univ post-grad schl; seeks Western States; Age 42.

INTERNIST: Board Elig, med & cardio; trnd univ hosp; inter'd indus med as a career; seeks further exper in adm or clinical capacity; 2 yrs, indus exper as staff phys and district chief; Hahneman; early 30's; prefers Pa, N.J., N.Y., Del or eastern seaboard.

Staff Physician: Passed Part I, Ortho Bds; 3 yrs, priv pract; seeks Indus Med career; any locality; Age 33.

Staff Physician: MPH, Univ of Mich; M.D., Colo; 1 yr, post-grad, Indus Hlth, Harvard; 6 yrs, Indus Phys, important oil co; seeks full-time indus hlth wk—dir active med, Indus Hygiene & Safety progm, Kansas City area; Age 36.

Staff Physician: Interested indus post, leading to Med Dirshp; 10 yrs, private, general pract includg 7 yrs as med examiner, lge electric mfgr co; capable genl & ortho surg; any locality; early 40's.

Staff Physician: 35, post-grad work; aviation med & atomic-biological-chemical defense; 1 yrs, priv pract & 1 yr, indust wk; seeks area west of Rocky Mtns.

Staff Physician: Seeks primarily foreign appt, will consider others; 2 yrs, priv pract; 4 yrs, Indus Med; age 34.

Staff Physician: 7 yrs, owned & oper'd 50 bd hsp; wishes change in med career; seeks Indus post combining med abil with adm, counseling or clin rsrch; prefs SW or MW, but will locate anywhere; Age 35.

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Medical Director: Full charge, entire program; 13 plants, coast-to-coast; major co, rapidly expanding; should be Board Internist w/good clinical & indus exper—prefer one Cert'd Occupl Med; to $40,000; E.

Associate Medical Director: Clinical medicine as applied to elaborate executive hlth prog; requires Bd Internist; over $20,000; Bay Area, Calif.

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Industrial Physician: (a) Rsrch div, lge co; 7500 emply; shld have strong interest in career indus med; exper not nec; excl sal, fringes & bonus; lge city; sevl med schls; MW. (b) Dipl or Elig; join 3 young AAGP's; $12,000 1st yr, followed by increases, bonus, prtnrshp; fringe benefits; Hawaii. (c) Southerner, qual as chief w/some int med exper; major co; about $15,000 plus excl benefits; Alabama.

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To keep pace with a changing technology and multiplying hazards in the work environment, the Division will carry out an expanded research program directed at developing better techniques, materials, and equipment for use in the prevention, diagnosis, and treatment of occupational disease. Major research efforts will be intensified in toxicology and in related fields of clinical medicine, engineering, chemistry, and physics. In addition, the physiological and psychological factors in the work environment will come under more penetrating study.

Greater emphasis will also be focused on the training of personnel in occupational medicine and nursing and in industrial hygiene to meet the need of this rapidly growing field. The Division will work with academic institutions and other groups to help develop the necessary professional resources.

A third area of major expansion is in state aid services, designed to support and assist official agencies in the development and operation of occupational health programs throughout the nation.

The Division will also be responsible for stimulating effective community and industrial efforts to supply occupational health services.

Research and technical services, as well as training activities, will be carried out at Cincinnati, Ohio. State aid activities, occupational health nursing consultation, and studies and consultation relating to employee health programs will be centered at the Division's administrative headquarters in Washington, D. C.

Dr. Harold J. Magnuson, designated Chief of the new Division of Occupational Health, has directed occupational health activities of the Public Health Service for the past four years. Previously, he had served as chief of operational research for the Service's venereal disease program. Dr. Magnuson received his M.D. in 1938 from the University of Southern California and the degree of Master of Public Health in 1942 from the Johns Hopkins School of Hygiene and Public Health. He was commissioned in the Public Health Service in 1941.

Money for Research

Facts about fellowships for health research provided by federal and nongovernmental agencies are now available in a single report, "Fellowships for Health Research," issued by the National Health Council. Based on a meeting of the Council's Committee on Research, the report contains information about the fellowship and traineeship programs of four federal and 22 nongovernmental agencies.

Opportunities for advanced education available through the National Re-

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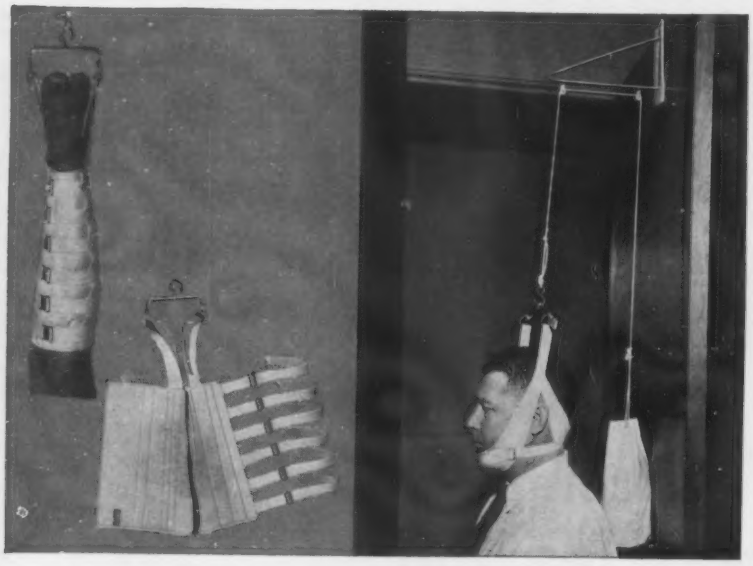
for positive therapy, comfortable use in hospital or home



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Available in complete set or individual units

The improved Camp Head Halter is lined with foam rubber vulcanized to strong tackle twill for patient comfort and better fit. Camp's side buckle opening feature permits presetting by doctor or patients for easy donning and removing in the hospital or at home and makes it possible to apply the halter without movement of the patient's head. The notched spreader bar affords use in varying widths.

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- minimal local irritation and less chance of local contamination.
- metabolic studies show electrolyte disturbance does not occur when Kenalog is applied topically.[1, 4, 5]
- easy to apply, gives broad, even coverage, and permits observation of lesions as they heal.

Indications: Atopic dermatitis, contact dermatitis, eczematous dermatitis, neurodermatitis, seborrheic dermatitis, insect bites, pruritus ani and vulvae, lichen simplex chronicus, exfoliative dermatitis, stasis dermatitis, nummular eczema, sunburn.

Dosage: Apply the spray to the affected areas from a distance of 3 to 6 inches, t.i.d. or q.i.d. A 3-second spray (delivering approximately 0.1 mg. of triamcinolone acetonide) covers an area about the size of the hand. *Cover the eyes when using Kenalog Spray on or near the face.*

Supply: Kenalog Spray in 50 and 150 Gm. containers of 3.3 mg. and 10 mg. triamcinolone acetonide respectively. Also available—Kenalog Cream (0.1%), Kenalog Ointment (0.1%) and Kenalog Lotion (0.1%).

References: 1. Reports to the Squibb Institute for Medical Research. 2. Howell, C. M.: Squibb Clin. Res. Notes *1*:5 (Oct.) 1958. 3. Goodman, J. J.: Squibb Clin. Res. Notes *1*:1 (Oct.) 1958. 4. Smith, J. G., Jr.; Zawisza, R. J., and Blank, H.: Squibb Clin. Res. Notes *1*:6 (Oct.) 1958. 5. Fitzpatrick, T. B.; Crowe, F. W., and Walker, S. A.: Squibb Clin. Res. Notes *1*:1 (Oct.) 1958. 6. Lerner, A. B.: Squibb Clin. Res. Notes *1*:2 (Oct.) 1958. 7. Robinson, R. C. V.: Bull. School of Med., U. Maryland 43:34 (July) 1958.

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search Council, the National Science Foundation, the Office of Education (National Defense Education Act), and the U. S. Public Health Service are described. A tabulation of nongovernmental fellowships includes information on fellowships obtainable from voluntary health agencies, foundations, insurance and pharmaceutical organizations.

The report gives details about the types of research fellowships, eligibility, the amount of the awards, the length of time for which the fellowships are awarded, location of training, and the time schedule for applications. Included also are summaries of presentations at a 1960 meeting of the Council's Committee on Research which provide valuable background information about the fellowship programs.

Copies of "Fellowships for Health Research" may be purchased for $1.00 from the National Health Council, 1790 Broadway, New York 19, N. Y.

Occupational Dermatitis

The Bureau of Occupational Health of the California Department of Public Health has issued a report entitled "Occupational Dermatitis in California." Outstanding items in this brochure are quoted:

"In 1958, 9,126 cases of occupational dermatitis were reported, exclusive of poison oak. Three-fifths of these cases were reported as contact dermatitis. Hands and wrists were the sites most frequently reported. Physicians indicated that 50% of the cases would require treatment up to 28 days and that 10% would require even longer treatment. Although complete data are not available, women appear to be more susceptible than men to occupational dermatitis. On 20% of the cases reported, the physician indicated that time would be lost from work. Manufacturing and agriculture are the industry categories where workers are at highest risk. A wide variety of dermatitis-producing agents were reported and these varied by industry group."

"In 1958 there was an average of 5,619,900 employed persons in California, of which about 80% were covered by workmen's compensation. The incidence of dermatitis cases among workers in covered employment was two per 1,000 workers."

Among the major causes of occupational dermatitis, acids, alkalis and other chemicals stand first being responsible for about 17%. Next in order comes food products with 10%, parasitic agents 7%, solvents 7% and soaps and detergents 6%. At the lower end of the scale may be found radiant energy which is responsible for about 1% of the cases.

With respect to classes of workers, unskilled laborers stand at the top as presenting about 27% of all dermatitis. This is followed by carpenters, plasterers, cement workers, painters and electricians.

While some compilations provided cause certain industries or trades to stand out boldly as the source of occupational dermatitis, these figures reflect only the number of such pursuits or their size. Other compilations relate the number of cases to the total number of workers exposed. Only then does the frequency rate become apparent. On this basis it is established that plastic

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fabrication and kindred occupations head the list of offenders with a rate of 12.5 cases per 1000 persons exposed. It is noted with astonishment that the manufacture of petroleum products, an outstanding industry in California, provided one of the lowest frequency rates of all, being only 0.5 cases per 1000 workers.

Water Pollution

Today the quality of the country's tap water is matched by few countries anywhere in the world. To keep it that way in the face of mounting difficulties is the serious challenge ahead.

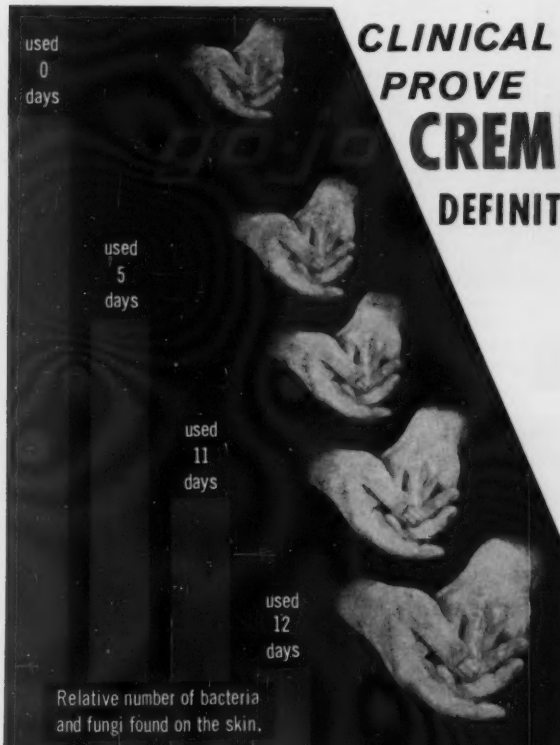
One of these difficulties is the sheer volume of wastes created by a rapidly growing urban civilization. Many people have witnessed within their own lifetime the "death" of a stream from the discharge of waste in volumes beyond its capacity to absorb. The visible evidence — in the form of odors and unsightliness, the disappearance of game fish, and the decline in boating and other water recreation — is unmistakable.

A second difficulty stems from the changing composition of municipal and industrial wastes. Before World War II waterborne epidemics and sporadic disease outbreaks were usually localized and mainly caused by known, living, bacterial organisms which could be quickly identified and brought under control. Today the problem of controlling pollution is vastly more complex because a changing industrial technology has created a whole new range of contaminants, mostly chemical in nature, which spread far beyond their source, are extremely difficult to identify and control, and whose long-range effects on human beings are unknown. It will probably turn out, indeed, that what we don't know *can* hurt us.

The enormous expansion of the synthetic chemical and petrochemical industries in the last two decades has in itself created a major new facet to the water pollution problem. The residues of millions of pounds of detergents, insecticides, herbicides, solvents, cleaners, and other synthetic compounds now find their way into watercourses either in the course of the manufacturing process or in the use of the product by the consumer.

With a booming nuclear technology already in being, we must guard against the potential hazards of radioactive contamination of water. Of even more immediate significance is thermal contamination from use of water by industrial plants for cooling. Returning water to a stream at a higher temperature than when it was withdrawn reduces oxygen content and impairs the stream's natural purification potential. If stream temperatures are high enough, they destroy oxygen-producing algae. Fish kills are a sure sign that this is happening.

Many of these new types of



CLINICAL HAND WASHING TESTS PROVE

CREME HAND CLEANER HAS DEFINITE BACTERIOSTATIC PROPERTIES

By reducing the number of bacteria and fungi accumulating on workers' hands, the probability of skin irritations and industrial dermatitis is diminished. In a recent clinical test* subjects representing a wide range of occupations used Go-Jo Creme Hand Cleaner for twelve days. Upon comparing skin bacterial counts, it was found that the regular use of Go-Jo Creme Hand Cleaner was accompanied by a statistically significant reduction in the numbers of bacteria and fungi. The reduction was greater than 99% of the original count.

*Price Hand Washing Test (Jour. Amer. Med. Assoc. 111,1993-96,1938), as performed by an independent microbiological testing laboratory (name on request).

LET Go-Jo CREME HAND CLEANER WORK IN YOUR PLANT TO HELP PREVENT INDUSTRIAL DERMATITIS.

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wastes are partly or wholly unaffected by present water and sewage treatment processes. Some even interfere with treatment processes. It is known, however, that tiny amounts of such contaminants remain in the water people actually drink.

The concentrations of these pollutants in water are not large enough to cause immediate or acute effects on human beings. But this is scarcely reassuring — particularly if we recall the well-known story of the women who tipped tiny brushes in their mouths as they painted radium watch dials in the 1920's. At that time, of course, it was not known that exposure to radium in such small amounts could cause cancer. Many years later nearly all developed the disease in some form and began to die one by one.

Today public health authorities are seriously concerned over the possible long-range toxic effects on Americans of the wastes which are byproducts of the civilization they have created.

The serious public health implications of the Nation's present and future water resources problem will be discussed, along with other aspects of the problem, at the National Conference on Water Pollution next December. The Conference, which is receiving the enthusiastic support of civic, industrial, and labor groups throughout the country, will be attended by well over 1,000 of the nation's leading professional and technical people in the field as well as by representatives of national organizations.

—*Bulletin* of the National Conference on Water Pollution, U. S. Public Health Service, Sept. 2, 1960.

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Trailer Clinic

A mobile medical department brings medical services to employees of the Dow Chemical Co., Midland, Mich. The moving trailer plays a threefold role as a hearing conservation center, first-aid station for Civil Defense, and as an extension of all medical department services. The mobile trailer saves employees' time, says Medical Director Dr. Harold L. Gordon, by bringing medical aid to the job, eliminating long trips to the medical department by workers from outlying locations.

—From *Industrial Relations News*, Sept. 3, 1960.

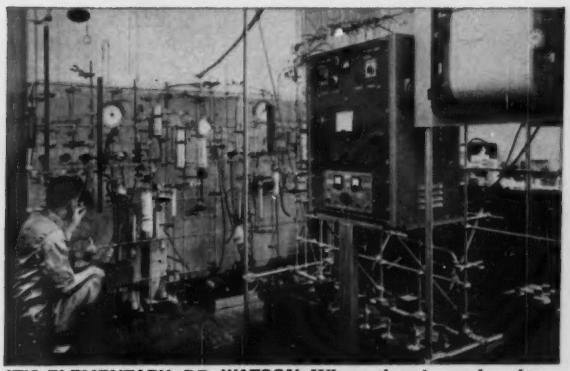
Abstract Service

The International Labor Office, in cooperation with the International Social Security Association and national safety and health institutions from 23 countries, has established in Geneva, Switzerland, a new information service known as CIS — the International Occupational Safety and Health Information Center. The CIS abstracts the literature and legislation of many countries dealing with all aspects of occupational safety and health. Abstracts are printed on 3 x 5 cards and give a bibliographic reference, an English summary, and a classification number. Some 4,000 to 5,000 abstracts will be issued yearly.

Subscriptions cost $40 a year. Checks should be sent to the International Labor Office, Washington Branch, 917 Fifteenth Street, N.W., Washington 5, D. C.

MEET THE SHREWDEST "PRIVATE EYES" IN THE BUSINESS

When it comes to getting the low-down on fine tobacco, nothing outsmarts these ingenious machines at the American Tobacco Research Laboratory

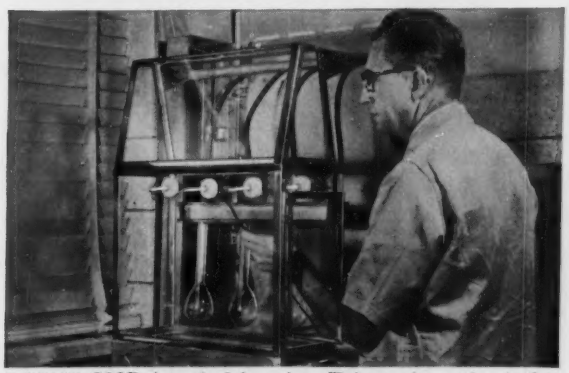


IT'S ELEMENTARY, DR. WATSON: Where there's smoke, there are volatile constituents that affect taste. To study them, American Tobacco researchers condense smoke vapors, distill, collect and separate components with the complex apparatus shown here.

HAVE ISOTOPES—WILL TRAVEL: No scientific detective story is complete without radio isotopes. American Tobacco has pioneered in radiological studies of tobacco. In this new, ultramodern laboratory, such studies as raising tobacco in a radioactive CO_2 atmosphere are conducted for test purposes.

THE HEAT'S ON: To answer such vital questions as the temperature and the combustion products formed at the burning zone in tobacco, the research laboratory is equipped with X-ray equipment (left), tobacco-burning equipment (center) and temperature-recording device (right).

TRACKDOWN: American Tobacco specialists utilize all the important analytical instruments now available to test and examine tobacco and materials used in tobacco. Here, in one of countless tests, a flame photometer determines mineral constituents of tobacco.



A SOLID CASE: A typical American Tobacco invention is the cigarette-smoking machine, now widely used throughout the industry. The machine collects nicotine and smoke solids on a filter. Scores of tests have been developed to examine the collected solids.

The American Tobacco Company

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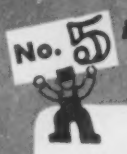


In a series of washroom survey comments from "SBS soap counselors"

We pinpointed a way they could cut costs by eliminating soap waste!

Robert Foss,
veteran SBS soap counselor in the Wisconsin-Minnesota area, has helped scores of plants find economical solutions to their wash-up and hygiene problems. Here's his report on a metalworking plant employing better than 3800 workers:

"We found this plant's washroom costs way up! The powdered and liquid soaps provided in the washrooms were being wasted by the handfuls. Result: unsightly washbasins, slippery floors, excessive soap and housekeeping costs. In addition, these soaps proved only partially effective against the more irritating, difficult-to-remove soils in the plant.

We showed them how much more *effectively and economically* SBS 60 can do the job. Formulated especially for industrial use, this quick-acting *cream* deodorant soap is virtually impossible to waste . . . is equally safe on face, hands or body . . . and removes *all* the general soils found in this plant."

Money-saving suggestions like this *begin* with OPERATION PINPOINT—a thought-provoking presentation filled with facts about skin hygiene and washroom maintenance. The SBS soap counselor serving your area can pinpoint the right soap to do every skin cleansing job best and at lowest cost in your plant. Let him show you OPERATION PINPOINT . . . just call your nearest SBS office, collect.

the washword of industry

SBS sugar beet products co.

SAGINAW, MICH. • Los Angeles, Calif. • Newark, N.J.
CANADA: Chemical By-Products, Ltd., Toronto, Ontario

LUCKY LUCY

She doesn't depend on crossed fingers to safeguard her health. She knows many types of cancer can be cured if treated in time, so she sees her doctor at the first sign of something wrong.

CHIPPER CHARLIE

Her husband Charlie has never been sick a day in his life. But he knows it can happen to him, so he gets a regular checkup every year.

Lucy and Charlie also contribute generously to the American Cancer Society Crusade because they know this is the best way to help conquer cancer. Guard your family—fight cancer with a checkup and a check. Send your contributions to "Cancer," in care of your local post office.

AMERICAN CANCER SOCIETY

"...A SIGNIFICANT MAJOR ADVANCE IN THE MANAGEMENT OF TINEA CAPITIS."*

GRiFULVIN®

Griseofulvin

FIRST ORALLY EFFECTIVE AGENT IN RINGWORM

WELL TOLERATED • OBVIATES NEED FOR X-RAY EPILATION • USUALLY CLEARS SCALP RINGWORM WITHIN 4 TO 6 WEEKS

Dosage: Adults—250 mg. q.i.d. or 500 mg. b.i.d. Children—According to weight, 250 mg. to 1.0 Gm. daily, in divided doses.

Supplied: new 500 mg. scored yellow tablets, bottles of 20 and 100; and 250 mg. scored aquamarine tablets, bottles of 16 and 100.

*Newcomer, V. D., et al.: A.M.A. J. Dis. Child. 99:585, 1960.

McNEIL LABORATORIES, INC • PHILADELPHIA 32, PA.

McNEIL

Tinea capitis, before GRIFULVIN. Microscopic and Wood's light examinations help differentiate this infection from non-ringworm disorders.

After 5 weeks' treatment with GRIFULVIN. (Photo taken 1½ months after discontinuance of medication.)

for the silent syndrome*...

*the unmentioned edema, mood changes, GI distress, preceding menstruation

a comprehensive therapy

NEW

CYCLEX®

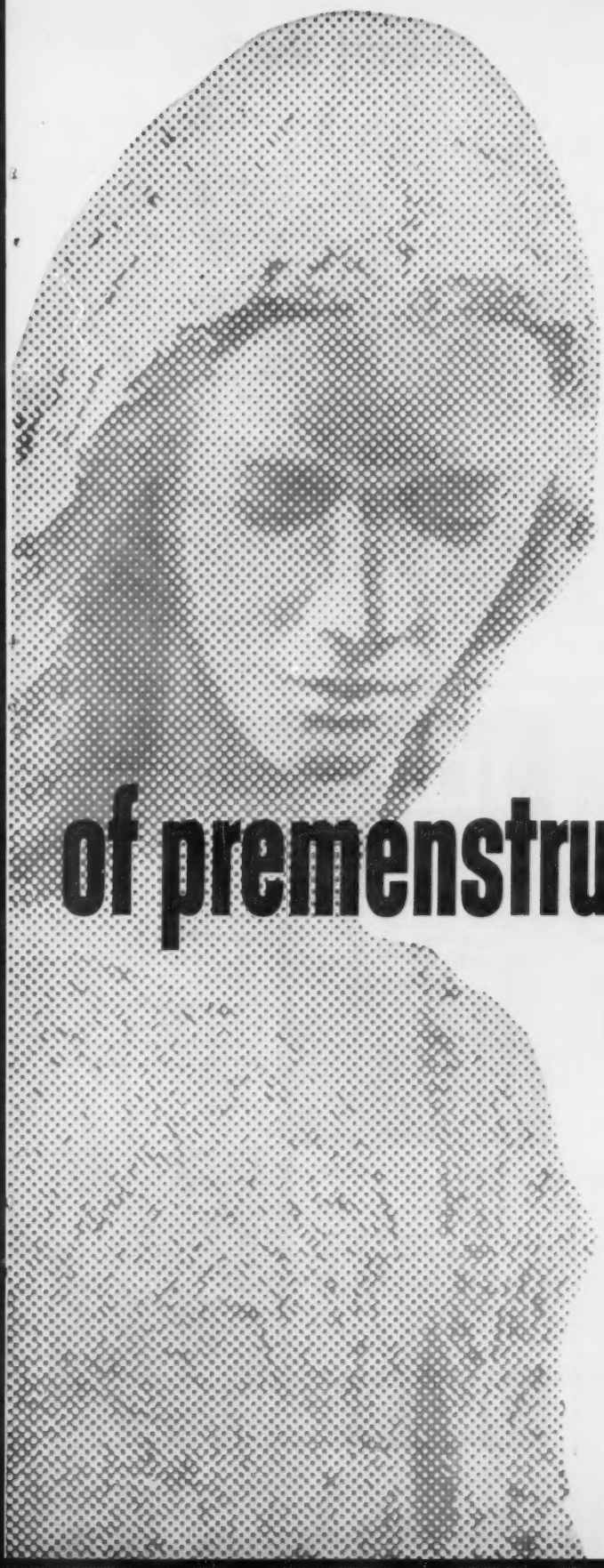
HYDRODIURIL® WITH MEPROBAMATE
HYDROCHLOROTHIAZIDE

to relieve the symptoms

for EDEMA...
CYCLEX provides the prompt diuresis of HYDRODIURIL for rapid reduction of weight gain, breast fullness, abdominal congestion

for MOOD-CHANGES...
CYCLEX supplies the effective relief of meprobamate for nervousness, irritability, tension, nausea, malaise, insomnia

for GI DISTRESS...
CYCLEX affords quick-acting relief of nausea and bloating associated with premenstrual tension.



INDICATION: CYCLEX is indicated for the relief of premenstrual tension with edema.

USUAL DOSAGE:
One CYCLEX Tablet 1 or 2 times daily, beginning when symptoms appear and continuing until the onset of menses.

# of premenstrual tension

SUPPLIED: CYCLEX Tablets are supplied in bottles of 100. Each tablet contains 25 mg. of hydrochlorothiazide and 200 mg. of meprobamate.

Additional information on CYCLEX is available to physicians on request.

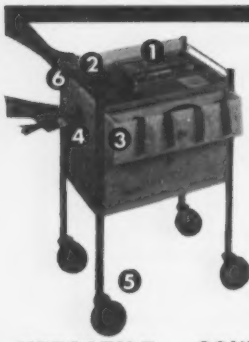
CYCLEX and HYDRODIURIL are trademarks of Merck & Co., INC.

MERCK SHARP & DOHME
Division of Merck & Co., INC.
West Point, Pa.

NEW *Burdick*

EK-III console

ECG accuracy and convenience are skillfully combined in the new Burdick EK-III Console Electrocardiograph — especially adapted for hospital use. The built-in recording unit features greatly simplified paper loading, finer definition with a tubular stylus, fast switching from lead to lead, and both 25- and 50-mm. speeds. Easy mobility plus ample storage and work space are also important features of the EK-III Console.



1. Recessed, removable Electrocardiograph
2. Working space on cabinet top
3. Ample drawer capacity
4. Retractable line cord
5. Large, easy-rolling casters
6. Convenient handle bars

VERSATILE • CONVENIENT • DEPENDABLE

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Index of Advertisers

American Cancer Society....50
American Tobacco Co.....47
Armour Pharmaceutical Co. 18, 33
Arnar-Stone Laboratories....56
Bard-Parker Co., Inc.....44
Becton, Dickinson & Co.....28
Bristol-Myers Co.....36
Burdick Corp. 54
Cambridge Instrument Co., Inc. 49
Camp & Co., S. H.....42
Chesebrough-Pond's, Inc.....25
Ciba Pharmaceutical Products, Inc. 37
Coca-Cola Co. 56
Desitin Chemical Co. 32
Doho Chemical Corp. 20
Dome Chemicals, Inc.....17, 29
Gojer, Inc. 45
Ille Electric Corp. 54
Johnson & Johnson 1
Lilly & Co., Eli 38
Maico Electronics, Inc. 41
McNeil Laboratories, Inc....14, 15, 35, 51, 3rd cover
Merck Sharp & Dohme...23, 52, 53
Parke, Davis & Co. 2, 26
Reed & Carnrick.....34
Riker Laboratories, Inc. 2nd cover
Robins & Co., Inc., A. H...16, 27
Roerig & Co., J. B. 5
Schering Corp. 7
Schueler & Co. 49
Searle & Co., G. D. 12, 39
Squibb & Sons, E. R. 43
Sugar Beet Products Co.....50
Tailby-Nason Co., Inc.....22
Tassette, Inc. 55
Upjohn Co. 8, 9
U. S. Savings Bonds.....48
Wallace Laboratories....24, 30, 31, 4th cover
Warner-Chilcott Laboratories, Inc. 25
Whitehall Laboratories...19, 40
Williams, Inc., J. B. 46
Winthrop Laboratories, Inc...10, 11, 21
Woodward Medical Personnel Bureau 41

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(Stationary)

For subaqua therapy. Stainless steel tank with electric turbine ejector and thermostatic mixing valve.

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MOISTAIRE HEAT THERAPY UNIT

Delivers temperature-controlled moist heat safely and effectively. Complete with stainless steel treatment hood, table, latex foam table pad, nylon moistureproof curtains and 4-quart filling can.

ILLE ELECTRIC CORPORATION
Reach Road, Williamsport, Pa.

NOW a truly definitive answer to an ever-present problem

Tassette®

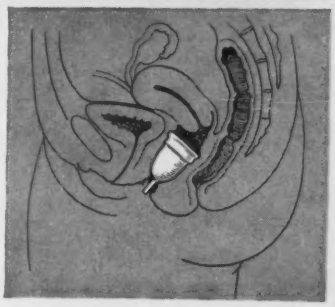
the safe and sanitary menstrual cup

You can prescribe Tassette with full assurance that your patient will find a safe, effective and completely acceptable answer to her menstrual control problem. *Tassette*, made of soft pliable rubber fits anatomically at the mid point of the vaginal wall and acts as a catch basin for the menstrual flow (see anatomical drawing). It is easily folded, needs no inserter, and can be simply emptied and replaced as needed. Tassette requires no measurements or fitting, and can be worn with complete comfort at all times.

Tassette permits your patient to swim, dance and engage in any activity because it catches the flow and seals it off completely. Thus there is no odor or possibility of leakage or staining as may occur during periods of heavy flow when tampons are used. There is no danger of chafing, irritation or infection, and no belt is required, as with ordinary sanitary napkins.

Tassette has many medical applications other than its use as a menstrual cup. During the intermenstrual period it provides the most satisfactory and safe method for collecting vaginal, cervical or uterine secretions for diagnostic purposes. Tassette has also been used to insure against leakages in vesico-vaginal fistula.

Modern internal menstrual control is now accepted by the medical profession and Tassette is widely recommended by gynecologists in place of sanitary napkins and tampons. In order to acquaint you with Tassette this special offer is made: Send $3.50 (reg. price $4.95) for one Tassette with complete directions, postage prepaid. Tassette guarantees satisfactory use for two years or your money back.



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170 Atlantic Square
Stamford, Conn.

Dept. M. 6

☐ Cash
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Please send me_____ Tassettes. Enclosed is $_____

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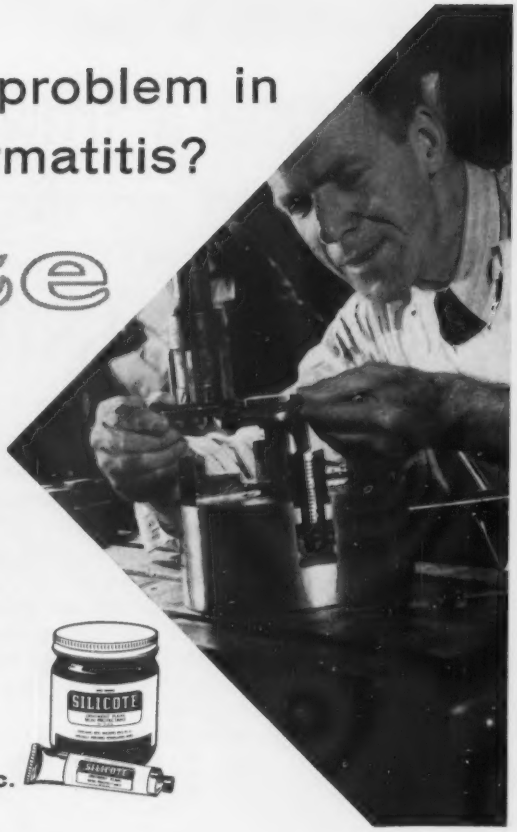
do you have a problem in industrial dermatitis?

Silicote

SILICONE SKIN PROTECTANT



Silicote provides an effective barrier against a wide range of skin irritants. It adheres to the skin, is not easily removed, and, when properly applied, can not be seen nor felt on the skin, permitting workers performing delicate tasks to stay on the job.

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—water, acids, alkalies, foods, organic materials, resins, cement, tanning solutions, inks, polishes, woods, glue, coolants, soluble cutting oils, rubber, plastics, synthetics, dyes, metals, paints, lacquers, thinners, etc.

IN TREATMENT

of contact dermatoses, Silicote clears up many cases not responsive to other therapy.

Silicote is the only preparation containing 30% silicones (dimethicone) in specially prepared petrolatum base. Silicote is non-occlusive.

May we work with you in your particular problem? Send for clinical supply.

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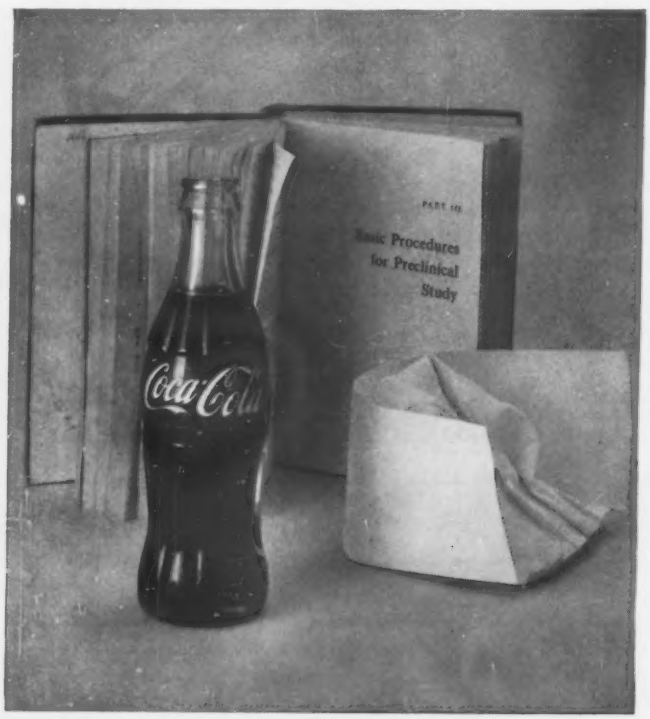


When too many tasks
seem to crowd
the unyielding hours,
a welcome
"pause that refreshes"
with ice-cold Coca-Cola
often puts things
into manageable order.

DRINK
Coca-Cola
REG. U.S. PAT. OFF.

FOR THAT EXTRA MEASURE OF RELIEF
IN SEVERELY PAINFUL RHEUMATIC AND TRAUMATIC DISORDERS

NEW

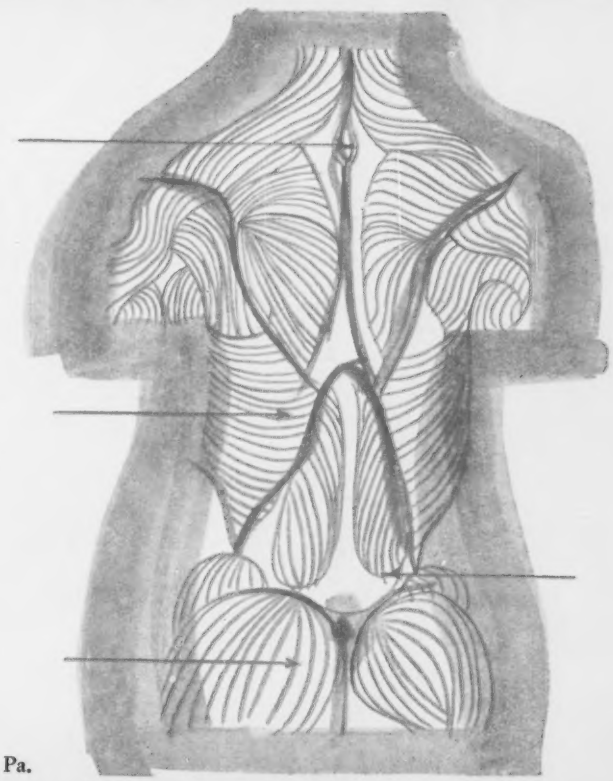
PARAFON® WITH CODEINE

The addition of the unrivaled analgesic potency of codeine phosphate to PARAFON provides the muscle relaxant-analgesic effect necessary in severely painful musculoskeletal disorders. In these conditions, PARAFON with Codeine◇ assures long-lasting relief of pain, stiffness and disability on low, practical dosage. Side effects are rare and seldom severe enough to warrant discontinuation of therapy.

dosage: One to two tablets 3 or 4 times a day.

supplied: White, compressed tablets, imprinted McNEIL, bottles of 24. Each tablet contains: PARAFLEX® Chlorzoxazone* 125 mg., TYLENOL® Acetaminophen 300 mg., and codeine phosphate 15 mg.

*U. S. Patent Pending
◇Narcotic for which oral Rx is permitted 307A59



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in over five years of clinical use and
more than 750 published clinical studies

Effective

for relief of anxiety and tension

Outstandingly Safe

- simple dosage schedule produces rapid, reliable tranquilization without unpredictable excitation
- no cumulative effects, thus no need for difficult dosage readjustments
- does not produce ataxia, change in appetite or libido
- does not produce depression, Parkinson-like symptoms, jaundice or agranulocytosis
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Miltown®

meprobamate (Wallace)

Usual dosage: One or two 400 mg. tablets t.i.d.
Supplied: 400 mg. scored tablets, 200 mg. sugar-coated tablets; or as MEPROTABS®– 400 mg. *unmarked*, coated tablets.

WALLACE LABORATORIES / *Cranbury, N. J.*

OH-2058

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